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IntechOpen Series
Education and Human Development,
Volume 10

Recent Perspectives on Preschool Education and Care

Edited by Hülya Şenol

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Published in London, United Kingdom

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http://dx.doi.org/10.5772/intechopen.107817
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First published in London, United Kingdom, 2024 by IntechOpen
IntechOpen is the global imprint of INTECHOPEN LIMITED, registered in England and Wales, registration number: 11086078, 5 Princes Gate Court, London, SW7 2QJ, United Kingdom
Printed in Croatia

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Additional hard and PDF copies can be obtained from orders@intechopen.com

Recent Perspectives on Preschool Education and Care
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p. cm.

This title is part of the Education and Human Development Book Series, Volume 10
Topic: Education
Series Editor: Katherine K.M. Stavropoulos
Topic Editor: Delfín Ortega-Sánchez

Print ISBN 978-1-83769-246-0
Online ISBN 978-1-83769-247-7
eBook (PDF) ISBN 978-1-83769-248-4
ISSN 2755-9513

IntechOpen Book Series

Education and Human Development

Volume 10

Aims and Scope of the Series

Education and Human Development is an interdisciplinary research area that aims to shed light on topics related to both learning and development. This Series is intended for researchers, practitioners, and students who are interested in understanding more about these fields and their applications.

Meet the Series Editor

Katherine Stavropoulos received her BA in Psychology from Trinity College, in Connecticut, USA and her Ph.D. in Experimental Psychology from the University of California, San Diego. She completed her postdoctoral work at the Yale Child Study Center with Dr. James McPartland. Dr. Stavropoulos' doctoral dissertation explored neural correlates of reward anticipation to social versus nonsocial stimuli in children with and without autism spectrum disorders (ASD). She has been a faculty member at the University of California, Riverside in the School of Education since 2016. Her research focuses on translational studies to explore the reward system in ASD, as well as how anxiety contributes to social challenges in ASD. She also investigates how behavioral interventions affect neural activity, behavior, and school performance in children with ASD. She is also involved in the diagnosis of children with ASD and is a licensed clinical psychologist in California. She is the Assistant Director of the SEARCH Center at UCR and is a faculty member in the Graduate Program in Neuroscience.

Meet the Volume Editor

Assoc. Prof. Dr. Hülya Şenol is a multidisciplinary researcher and academician with 32 years of teaching experience. She graduated from the Biology Department, Atatürk Education Faculty, Marmara University, Turkey, in 1991. She completed two master's degrees, one in Educational Sciences at Eastern Mediterranean University, North Cyprus, and one in Molecular Medicine at Near East University, North Cyprus. She holds a Ph.D. in Educational Administration, Management, Inspection, and Economy. From 1991 to 2011, she worked at many colleges in Turkey and North Cyprus as an instructor, ISO 9001 committee member, and deputy principal. She worked as a senior instructor in the Faculty of Arts and Sciences and Faculty of Education, Eastern Mediterranean University from 2004 to 2022. She holds certificates in Montessori philosophy and theory, daily activities, science, mathematics, and language studies in Montessori education. She attended many seminars on Montessori education. In 2014, she established a kindergarten called "Green Island Montessori Preschool," which offers Montessori education in Northern Cyprus. She has been a faculty member of the Faculty of Education, the dean of the Engineering Faculty, and the head of Biomedical Sciences at Cyprus Health and Social Sciences University, North Cyprus. She has published many book chapters, books, and articles in international peer-reviewed journals. She has also edited two books. Her research interests are educational leadership, professional development of leaders in education, school culture, total quality management in education, and service quality in education.

Contents

Preface

Children have a natural tendency to explore and learn. Learning begins at a very early age and continues throughout life. Children have a great desire to learn and explore; they actively explore their surroundings, learn to communicate, and form ideas about what they see around them. Children grow quickly, especially in the first six years, which we call the preschool period, and they become proficient in language, cognition, social-emotional development, and motor development with astonishing speed. For this reason, the child needs to continue their development in a healthy environment at a young age. The role of preschool education has been scientifically proven in the success of people at later ages. Everything that is given in a positive or negative sense directly affects a person in their adult years. Every child deserves the best quality preschool education and care.

This book provides a comprehensive overview of the importance of literacy, pedagogical leadership, high-quality preschool education, and preschool improvement practices. It also discusses the role of theater in childhood education and community approaches to funding and support. Other topics addressed include childhood obesity; connecting home, school, and communities; childcare social enterprises; teacher quality and professional development; motor, cognitive, nutritional, metabolic, and epigenetic influences on early childhood; and instructional and interactional aspects of childhood education.

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Chapter 1

Emergent Literacy Is Foundational to Health Literacy in Children: Interdisciplinary Relationships to Boost Child Health

Valerie A. Ubbes

Abstract

The purpose of this chapter is to describe and explain interdisciplinary connections between literacy and health for preschool children, preparing them to enter kindergarten with opportunities to develop both functional and interactive health literacy skills. Emergent literacy is foundational to the development of both functional health literacy and interactive health literacy among children. Enriched and healthy environments for children are fostered by their relationships with parents, peers, and professionals who act as literacy influencers when they use print and electronic books to build functional health knowledge coupled with interactive conversations about health. Preschool children who have access to multimodal literacy materials (e.g., print and electronic) and health affordances (e.g., toothbrushes, eyeglasses, hearing aids) will build literacy routines and health habits in tandem. Whole child development is woven from behaviors practiced at consistent times of the day. Emergent literacies that lead to functional and interactive health literacy support child identity and agency through a developmental process. The concepts of executive functioning, information processing, and self-regulation are further realized when children and their literacy influencers practice reading, writing, and speaking about health in various social contexts.

Keywords: emergent literacy, functional health literacy, interactive health literacy, multimodal literacies, rhythmical patterns, literacy routines, health habits, literacy influencers

1. Introduction

Throughout the early years of preschool education, parents and early childhood educators can use consistent patterns during the day so that children can practice literacy routines and health habits all together during mealtime, playtime, book time, nap time, and bedtime. Rhythms that form repeated patterns of movement, sight, sound, and language can bring engaging opportunities for literacy and health learning. Some professionals lack the interdisciplinary training to combine the domains of literacy and health into health literacy, but this chapter will build a vernacular that

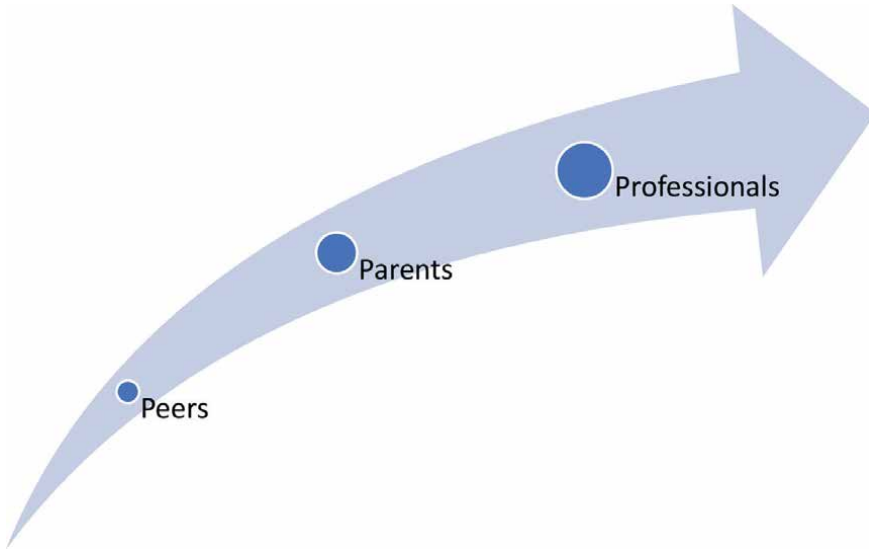

Figure 1.
Literacy influencers guide children's health experiences from their zone of proximal development by mediating health literacy events.

will serve as a common language so that health literacy can be understood by more people. Thus, the complexities and realities of conceptualizing health literacy from childhood onward will have the greatest impact across the life course [1]. Suggestions to start the process of health literacy development at ages 6 to 12 years [2, 3] and during high school [4] have been promoted. Therefore, this chapter will make clear the need to start health literacy experiences earlier during preschool development so that children are prepared to enter kindergarten with opportunities to develop both functional and interactive health literacy skills more fully than are currently being realized.

Figure 1 suggests that literacy influencers, such as peers, parents, and professionals, can scaffold preschool children's health experiences from their zone of proximal development by mediating health literacy events. Literacy influencers who guide children's health experiences from their zone of proximal development serve as significant role models to children by being the "guide on the side" during their ongoing language development. Language expressed in the form of oral language, written language, and body language [5] should also be woven rhythmically into a child's life so that language repertoires can continually influence their growing identity, agency, and independence.

The next section promotes the need to build health literacy events for children during consistent times of the day and the development of emergent literacy that leads to functional health literacy.

2. Build health literacy events for children during consistent times of the day

Optimal development and learning for children from birth to age 8 years includes a "strength-based, play-based approach" with environments that are culturally and linguistically appropriate [6]. Daily literacy and health routines can be tightly

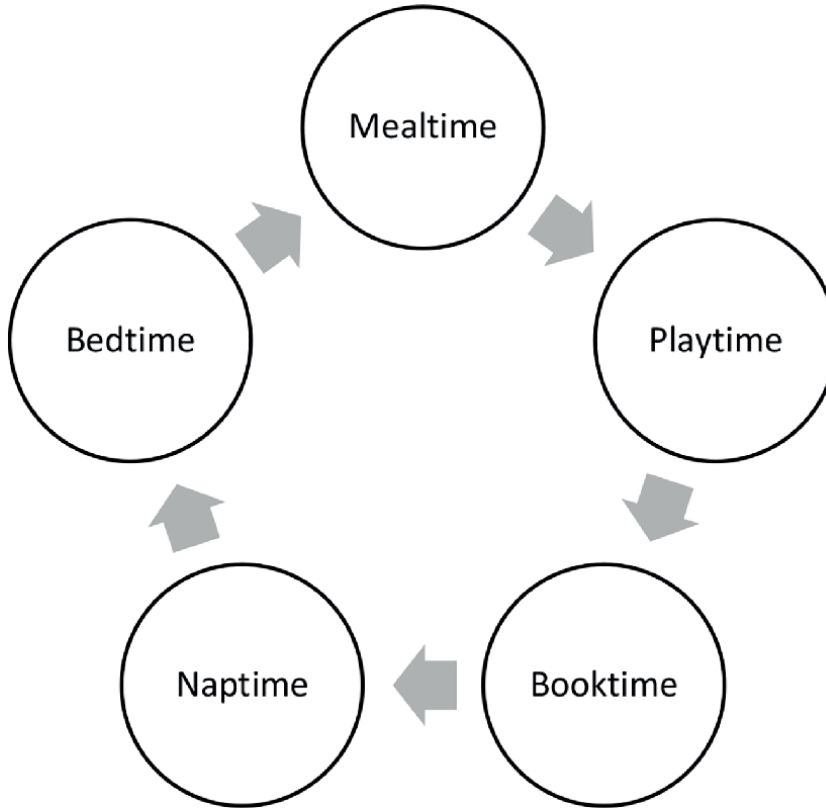

Figure 2.
Whole child development is woven from rhythmical patterns at consistent times of the day.

structured and/or free-flowing, with the latter being more child-directed. Child independence and agency are core to early childhood educational outcomes. Free-flowing routines allow for uninterrupted play, self-regulation of social and emotional skills, and deeper engagement in learning [7]. One inquiry-based pedagogical model suggests that children can learn and practice habits of health each day with time for nutritious foods and beverages; physical activity, movement, and play; sleep, rest, and quiet time; safety and hygiene; and relationships [8]. Interdisciplinary connections between health habits and literacy events throughout the day can be implemented when children transition through changing intervals of mealtime, playtime, book time, nap time, and bedtime (**Figure 2**).

These integrated literacy events with health routines are a basic form of health literacy (**Figure 3**), which emerges from the concepts of literacy and health. The next section will describe the interdisciplinary domains that inform health literacy, including how emergent literacy is related to two forms of health literacy.

2.1 Development of emergent literacy leads to functional health literacy

Literacy has been recognized by pediatricians as a distinct developmental domain in children [9]. Thousands of pediatric healthcare professionals have incorporated literacy promotion into primary care with children and their families through its evidence-based program called Reach Out and Read. Reach Out and

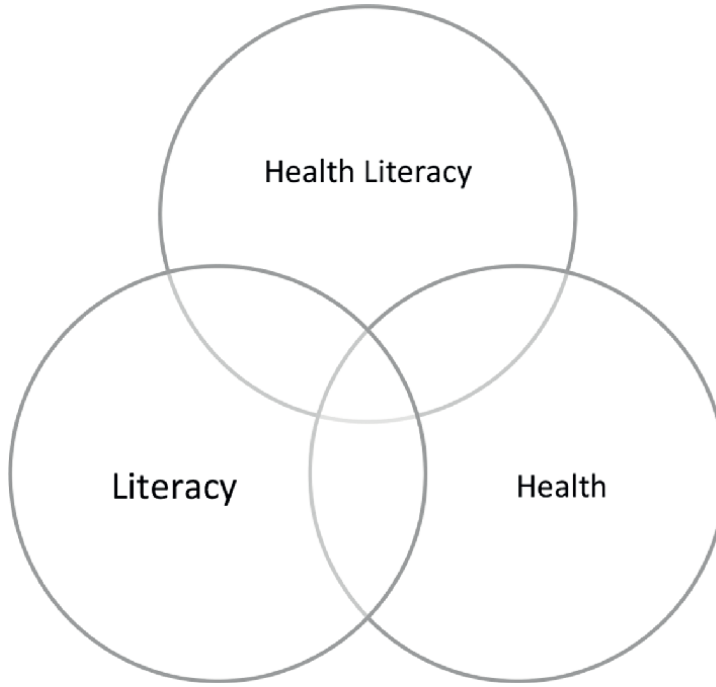

Figure 3.
Interdisciplinary domains that inform health literacy.

Read emphasizes the importance of parents reading aloud to their children every day and the value of book conversations for developing oral language skills while reading together. Emergent literacy is an informal acquisition of reading and writing skills that helps children get ready for school and leads to later success in reading [10]. Emergent literacy skills include phonological awareness, letter knowledge, and print awareness [11]. Reach Out and Read also recognizes the importance of literacy affordances by providing books for families to take home and start their home library of children's books.

Figure 4 shows how emergent literacy leads to functional health literacy while influencing child identity and agency through a developmental process. Whereas emergent literacy does not have its roots in health, functional health literacy does. Functional health literacy is the ability to read, write, and speak about health. Child language and literacy professionals tend to describe literacy as reading and writing and refer to oral languages as separate from literacy outcomes [12]. Functional health literacy combines all three forms of communication with an added emphasis on health.

Children gain a health-related identity when they learn to think, act, and talk about their health and observe their significant others doing normative health behaviors. Children gain agency when they learn a vernacular to express themselves in healthy ways through oral language, written language, body language, and multimodal language. As children mature in their understanding of self and others, interactive health literacy is fostered. Agency is further developed with access to sociocultural opportunities for critical health literacy (**Figure 4**).

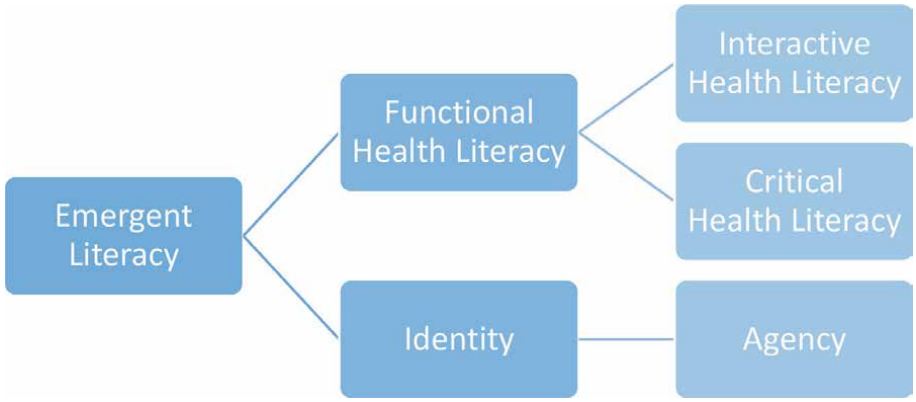

Figure 4.
Emergent literacy leads to functional health literacy while building child identity and agency through a developmental process.

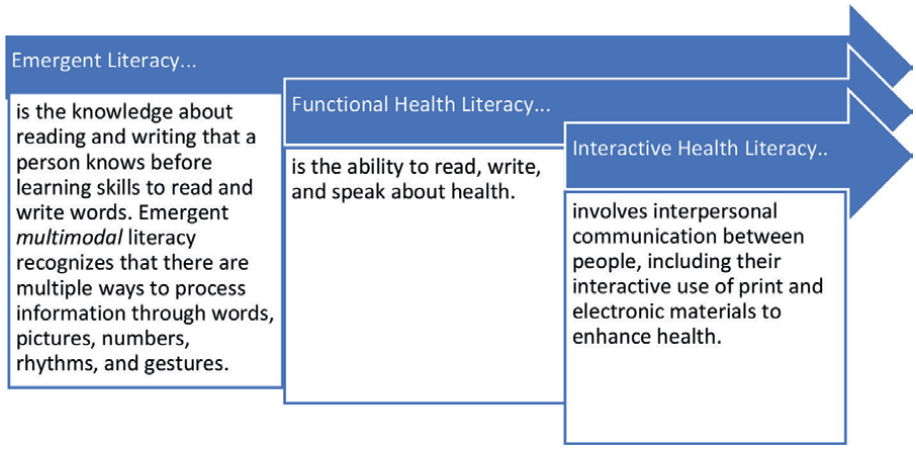

Figure 5.
Relationship between emergent literacy, functional health literacy, and interactive health literacy.

Whereas **Figure 4** highlights identity and agency as foundations of the three types of health literacy, **Figure 5** shows the developmental process of emergent literacy, functional health literacy, and interactive health literacy from left to right. Emergent literacy is the knowledge about reading and writing, which a person knows before learning skills to read and write words. Emergent *multimodal* literacy highlights the fact that individuals can process information beyond words while communicating meaning through pictures, numbers, rhythms, and gestures. The concept of multimodal literacy has been promoted for early childhood [13] and K-12 education [14]. This article makes multimodality more explicit by renaming emergent literacy as emergent *multimodal* literacy, owing to its potential to be more inclusive of individual needs and abilities. In addition, by moving beyond a narrow focus on the linguistic mode, multimodality using visual, aural, gestural, and spatial modes is more compatible and inclusive for learners when interacting with digital, electronic, and print materials. Hence, interactive health literacy is defined

as interpersonal communication between people, including their interactive use of print and electronic materials to enhance health.

2.2 Preparing preschool children for health literacy in schools

Health literacy was first used in 1974 as a call for health education standards in American schools for all grade levels [15]. Health literacy was later used as a subtitle for the "National Health Education Standards: Achieving Health Literacy" in 1995 [16]. In 2022, the National Consensus for School Health Education released the third edition of its model guidance for curriculum and instruction of the National Health Education Standards [4], which more fully conceptualizes a developmental model for health literacy.

Antecedents of health literacy are literacy and health-related experiences [17]. These two components establish the interdisciplinary connections between the domains of literacy and health to make health literacy. **Figure 6** shows the literacy and health-related affordances that facilitate the second type of health literacy called interactive health literacy. Notice that on the left side of the figure, literacy affordances include printed books, brochures, and newspapers, as well as electronic books, apps, and websites that children and their families access through literacy. On the right side of the figure, health-related affordances include access to fresh fruits and vegetables, water, toothbrushes, toothpaste, floss, reading glasses, hearing aids, and Braille devices so that all children have the physical supports and potential to become healthy.

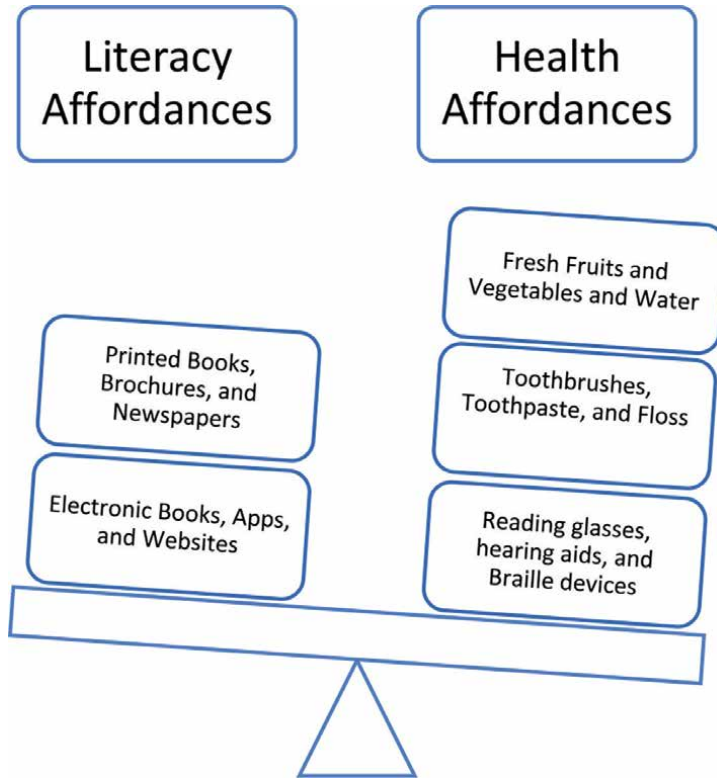

Figure 6.
Affordances that facilitate interactive health literacy.

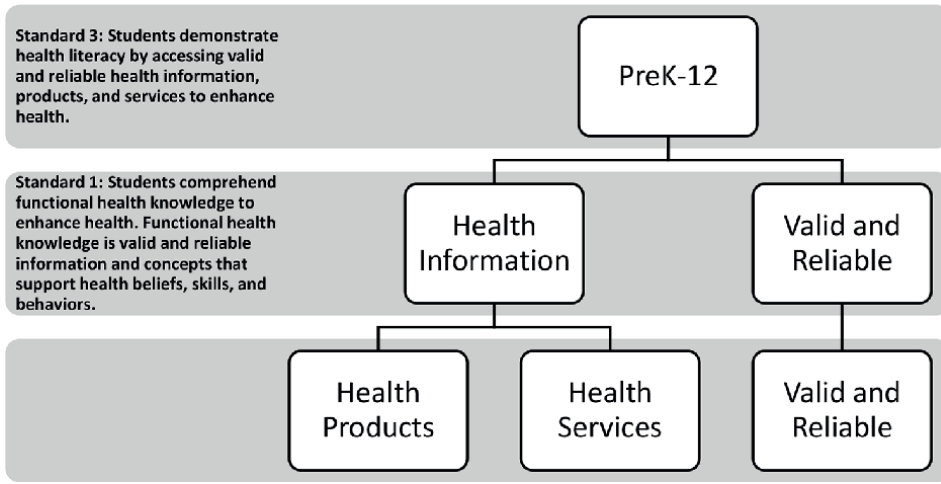

Figure 7.
National Health Education Standards 1 and 3 show the relationship between comprehending functional health knowledge and demonstrating health literacy.

Because interactive health literacy involves interpersonal communication among people, including an interactive use of print and electronic materials to enhance health, children will need to be supported on both sides of the affordance scale to become health literate. Hence, interactive health literacy moves children from individual identities into more agentic social identities when supported by interpersonal relationships, norms, and affordances. Multimodal literacies and language enable this transformational process of children's developmental journey from functional health literacy to interactive health literacy. As children learn about health in new contexts (e.g., schools, clinics, community agencies), there will be ongoing refinement to the dynamic rhythms between functional health literacy and interactive health literacy across the life course.

There is one other factor that prepares preschool children for health literacy in preK-12 schooling. **Figure 7** shows the importance of two National Health Education Standards (NHES) in developing functional health knowledge and health literacy. Functional health knowledge is defined as valid and reliable information and concepts that support health beliefs, skills, and behaviors [4]. Examples of these include knowing the benefits of eating healthy food and the characteristics of an emotionally healthy person [4]. Standard 1 of the NHES focuses on valid and reliable information and concepts needed to build an understanding of how to be a healthy child. In short, it focuses on *comprehending* functional health knowledge. NHES Standard 3 connects to NHES Standard 1 because students will need to access valid and reliable health information, products, and services to enhance health by *demonstrating* health literacy. The guiding principles and performance expectations for both of these standards including six other standards are available at https://www.schoolhealtheducation.org.

3. Conclusions

This article highlighted how emergent literacy is foundational to health literacy in children, including the need for emergent multimodal literacies. Interdisciplinary

connections from the domains of literacy and health form health literacy that can boost child health. Through a systematic approach, a visual-textual narrative described the need and rationale for establishing health literacy in early childhood education. Future work with preschool educators and parents will continue to elucidate the integrative steps needed to build literacy routines and health habits in tandem so children develop an identity and agency for health literacy. This enriched environment with adequate literacy and health affordances will help to support preschool children to enter kindergarten with opportunities to demonstrate their functional and interactive health literacy skills with a trajectory for further development in K-12 health education classrooms.

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Chapter 2

On the Path to Developing a High-Quality Inclusive Preschool System in the Irish Context: Outcomes from a Systemic Focus on Structural and Process Quality Dimensions

Lisha O'Sullivan and Emer Ring

Abstract

The contribution of high-quality preschool education to well-being and learning is recognised globally. In Ireland, a universal free preschool programme was introduced in 2010 for children aged between 3-year 2 months and 4-year 7 months and extended to two years' duration in 2018. The programme is now available to all children from the 1st September after the child has turned 2-years and 8 months. While high-quality preschool education benefits all children, it is particularly impactful for children who require targeted prevention and early intervention. Early experiences of the universal preschool system suggested that access remained a challenge for this cohort of children and required a cross-government strategic approach to strengthen policy coherence and secure access for all. Over the past decade, this has led to significant public investment focused on structural and process aspects of provision. This chapter will explore how developments supporting the structural aspects of quality and the resultant impact on process quality, contributing to the creation of high-quality inclusive preschool system. The chapter will conclude by considering how progress can be sustained as we continue on the path to building a preschool system designed to nurture the meaningful inclusion of all children where diversity becomes the norm.

Keywords: preschool education, universal provision, high quality, inclusion, diversity

1. Introduction

Following decades of exclusion and the ongoing struggle of the inclusion movement to gain traction [1–4], there is a broad acceptance, propelled by an international

rights-based campaign, that an inclusive education system is an imperative for children, families and society [1, 5, 6]. According to Odom and colleagues [7] inclusion involves "belonging, participating, and reaching one's full potential in a diverse society" (p. 347). Inclusive provision, in the early years, has been found to benefit all children [2]. Furthermore, findings from the UK longitudinal effective pre-school, primary and secondary education project (EPPSE 3-16+) study, suggest that preschool education may have the potential to reduce the risk of special educational needs (SEN) [8]. While we may hold strong aspirations and expectations that all young learners will benefit from high-quality preschool education, in reality numerous barriers to inclusive provision are evident. The research in this area suggests that attitudes, insufficient knowledge and understanding, and poor resourcing, can all hinder the creation of a system where all children are supported to flourish [2, 4].

Following the introduction of universal preschool education in 2010, the ambition was that all eligible children could access and fully participate in the Early Childhood Care and Education (ECCE) programmes being provided in preschool settings [4]. In the Irish context, building an inclusive model of preschool education is accepted as a principal indicator of a high-quality system and is positioned as a key focus of the quality assurance policy initiatives supporting high-quality preschool education experiences for all children. These initiatives are included in **Table 1** with reference to the macro (national policy level), meso (national programmes) and micro (preschool level) dimensions of policy implementation [9]. Their alignment with structural and process quality outcomes will be interrogated throughout the chapter and the discernible inter-relationship between the three levels of policy implementation considered [10, 11], see **Table 1**.

We will begin by providing an overview of preschool education in the Irish context. We will then review the literature on quality inclusive preschool education before discussing the measures, in place, to promote the structural dimensions of

Macro-level policy implementation national policy level	**Meso-level policy implementation national programmes**	**Micro-level policy implementation preschool level**
Better outcomes, brighter futures: The national policy framework for children and young people 2014–2020. Report of inter-departmental working group: Future investment in childcare in Ireland (2015). First five: A whole of government strategy for babies, young children and their families 2019–2028. Partnership for the public good: A new funding model for early learning and care and school-age childcare (2021). Nurturing skills' the workforce development plan for early learning and care and school-age childcare 2022–2028.	Síolta, The national quality framework for early childhood education (2006). Aistear: The early childhood curriculum framework (2009). Aistear-Síolta practice guide (2016). Diversity, equality and inclusion charter and guidelines for early childhood care and education (2016). Universal design guidelines for early learning and care settings (2019).	Free universal early childhood care and education programme (2010). Better start quality development service (2013). Tusla early years (pre school) inspectorate (2014). Better start access and inclusion model (2015). Better start early years learning and development unit (2015). Department of education early years inspectorate 2015.

Table 1.
Key policy initiatives supporting high-quality inclusive preschool education.

quality. The resultant impact on process quality to support high-quality inclusive preschool education will then be considered. To conclude, this chapter will reflect on progress and looking to the future, consider the next steps in sustaining a high-quality inclusive model of preschool education.

2. Inclusive preschool education: the Irish context

Preschool provision in Ireland has developed in an *ad hoc* fashion and due to a myriad of political, social and economic reasons, state involvement in preschool education has, historically, been minimal [2]. In terms of the education of young children, investment from the foundation of the Irish state in 1922 until relatively recently was almost exclusively concerned with primary schooling [1]. Consequently, there is significant diversity with regard to the provision of preschool education which includes a combination of private and community run services and a number of targeted intervention schemes for children considered at risk of educational disadvantage [12]. Changes in the social and economic climate in Ireland have led to a steady growth in the demand for early childhood services, resulting in a raft of policy, regulatory and curricular developments over the past 20 years. These developments culminated in 2010, with the advent of the first universal ECCE programme for children aged between 3 years 2 months and 4 years 7 months, applied to children from their third birthday in 2016 and extended to 2 years' duration in 2018 [1]. The ECCE programme is now available from the 1st September after the child has turned 2 years and 8 months, allowing all children to attend state-supported preschool provision up the age of 5-years and 6 months.

This programme provides a scheme of payments to early-years settings providing free preschool education. It runs across 38 weeks from September to June and entails 3 hours provision across a 5 day a week [4]. In the main, early years and school-aged childcare services are operated privately with the most recent figures indicating that only 26% of services are run by non-profit community organisations [13]. Participation rates in the ECCE programme remain high with an uptake of over 95% and parents have been largely positive regarding the impact of the programme [4, 14]. Although the formal school starting age in Ireland is 6 years, for historical reasons related to custom, practice and the neglect of preschool provision during the early years of the foundation of the state, children may enrol in primary school from the age of four. This practice was leading to concerns in terms of a dissonance between children's developmental trajectory and the expectations of the primary school curriculum [3]. The ECCE programme has contributed positively to disrupting this pattern and since its introduction, the proportion of 4-year-olds in the entry school grades continues to decline (from 46% in 2002, to 17% in 2022) [15].

Early experiences of universal preschool provision, however, indicated that access remained a challenge for children requiring targeted prevention and early intervention measures [2]. The vision articulated in the *Better Outcomes, Brighter Futures: The National Policy Framework for Children and Young People 2014: 2020* related to children's rights and equality was not being realised [16]. Supports available to children and preschools across the country were reported as being inequitable and the quality of how children and families were experiencing inclusion consequently varied. It was reported that a cohort of children were being excluded from preschool settings [4, 17] Overall, it seems that an interplay of factors such as poor investment over a long period, deficient infrastructure, a lack of resources, and limited knowledge and

understanding were cumulatively creating a barrier to some children accessing and participating meaningfully in preschool education [4]. Given that, in Ireland, unlike primary education, there is currently no legislative basis for, or constitutional right to, preschool education, a government response was required to rectify what were increasingly concerning circumstances for children, families and preschool educators. Based on an evolving cross-government strategic approach in relation to children, the *Inter-Departmental (IDG) Report on Supporting Access to Early Childhood Care and Education (ECCE) programme for Children with a Disability* was launched in 2015. The IDG Report [17] provided a pivot for the Better Start Access and Inclusion Model (AIM). The AIM was described as an evidence-based "child (and parent) centered model" (p. 5) informed by a consultation process with parents, representative groups, early years educators, academics and policy makers. Eschewing a diagnostic approach in favour of maintaining a focus on a child's developmental level, functional ability and need, as detailed in **Figure 1**, the AIM adopted seven levels of graduated support from universal (Levels 1–3) to targeted supports (Levels 4–7) [1].

Rather than being presented as a separate entity to be grafted onto existing provision, the model was situated within the existing regulatory, curriculum and quality assurance frameworks that were in place for preschool settings and the expectation that inclusive practice was already a requirement was clearly articulated. Since the AIM was launched, over 24,000 children have received 53,000 supports in over 4000 settings nationally [1]. In line with international evidence, AIM adopts a child-centred, whole-setting approach to supporting inclusion rather than targeting individual children, per se. Moreover, a formal diagnosis is not required to benefit from AIM supports [4]. Latest data indicate that in the preschool year 2020–2021, 4244 children attending 2045 preschool services received support from AIM [13]. Cross-government commitment to supporting inclusive preschool experiences for all children is evident in *First Five Whole of Government Strategy for Babies, Young Children and their Families 2019–2028* [18], a core objective of which is to build a sustainable model of high-quality preschool education that promotes diversity, inclusion and equitable participation, underpinned by research, evaluation and other relevant developments. The realisation of this commitment is apparent in the publication of *An End of Year One Review of the Access and Inclusion Model* in 2019 and the commissioning of an end of year three evaluation of the AIM, which is forthcoming [4, 19]. At the fulcrum of the regulatory, quality and curriculum frameworks within which the AIM model is located is a concern to ensure that all children's preschool experiences are supporting them to realise their potential through the provision of quality preschool education.

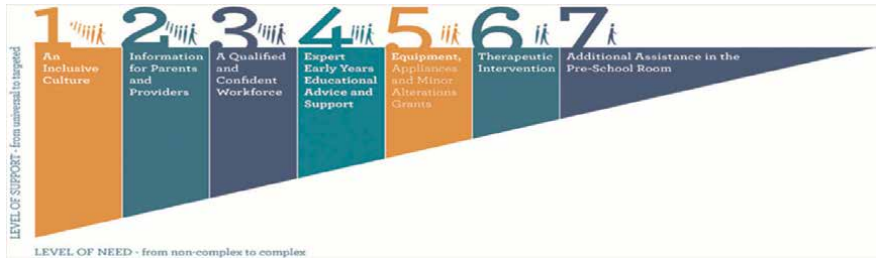

Figure 1.
The better start access and inclusion Model ([16], p. 27).

3. Quality preschool education

Quality involves the degree to which preschool education results in positive child outcomes [19]. Supporting positive child outcomes consequently has benefits for children, families, communities and society more broadly. Raising the quality of preschool education is also recognised as a powerful tool in eliminating poverty and equalising opportunity and outcomes [20–23]. While quality is influenced by local, national and international dimensions particular to each societal context, generally speaking the theoretical models in the literature propose that quality preschool education involves both structural and process dimensions [22, 24, 25]. Structural dimensions of quality include: teacher initial qualifications and continuing professional learning; the curriculum; the physical environment; teacher-child ratios and group sizes. Process quality encapsulates the experienced curriculum or programme of activities, and interactions [21, 22, 24]. Essentially, structural dimensions of quality collectively should support high process quality [24, 25]. Lower child-teacher ratios, smaller group sizes and teacher education for example, have been found to predict better teacher-child interactions [25]. The relationship between the structural and process dimensions of quality is recognised as complicated, however. Even when the structural dimensions of quality are well regulated, the quality of processes can fluctuate [24] and a robust quality assurance process is therefore essential. Moreover, isolating the effect of preschool education on outcomes is challenging as it is but one element of the child's bioecological system contributing to the child's overall development [2, 21]. In particular, research in this area underscores the central position of the home learning environment in a child's bioecological system and its indisputable influence on wellbeing and learning success [26].

While expanding access to preschool education is important in meeting all children's right to the best start in life, the quality of this education is essential to optimising wellbeing and learning. Improving quality requires significant public investment and recently Ireland has actively sought to re-balance its under-investment in preschool education. The budget allocation has consistently increased with state investment in early years and school-aged childcare reaching over €1 billion in 2023. In 2023, €308.2 million was budgeted for the ECCE programme (to benefit 108, 000 children) and AIM (benefiting 5000 children) [27]. This increase in investment, in turn, has been accompanied by measures focused at developing both the structural and process quality of preschool education.

3.1 Structural quality

The structural dimensions of quality tend to be those which are more measurable and which consequently, are highly regulated. **Figure 2** provides an overview of the foremost measures adopted by the government in relation to structural quality, which will be further explored in this section.

In Ireland, the Child and Family Agency, Tusla, has overall responsibility for regulating early years settings. All settings offering an ECCE service are required to comply with the *Childcare Act 1991* (Early Years Services) *Regulations, 2016; Child Care Act 1991 (Early Years Services) (Amendment) Regulations 2016;* and the *Child Care Act 1991 (Early Years Services) (Amendment) Regulations 2022* [28–30]. The Early Years Inspectorate at Tusla has responsibilities for registration, inspection, and enforcement

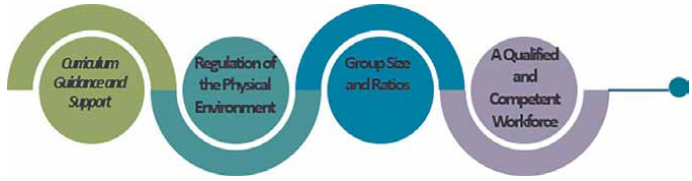

Figure 2.
Measures supporting structural quality.

of these regulations [14]. The inspection process is guided by the Quality and Regulatory Framework (QRF) published in 2018 [11]. Under the regulations, dimensions of structural quality such as minimum qualifications, group sizes, teacher-child ratios; and elements of the physical environment (for example, access to outdoor learning space), are tightly regulated.

While the regulations do not refer to *Aistear: the Early Childhood Curriculum Framework* [31] or *Síolta, the National Quality Framework for Early Childhood Education* [32], *Regulation 19 Health, Welfare and Development of the Child* [11] aligns with the frameworks in requiring that settings facilitate a programme which fosters each child's wellbeing, learning needs and interests. Under Regulation 19, the extent to which services provide for play, and support diversity and inclusion, are also inspected.

3.1.1 Curriculum guidance and support

Curriculum involves the content or 'what' of learning and many modern curricular frameworks also provide guidance on the processes or 'how' of learning [31, 33]. In Ireland, preschool education lacked a national curriculum until the early childhood curriculum framework, *Aistear* (translates as 'Journey' from the Irish language) was published in 2009 [31]. *Aistear's* status as a framework, rather than a curriculum, per se, provides flexibility in how settings align the framework with their selected curricular approach. This flexibility allows settings to provide responsive curriculum experiences infused with, and scaffolded by, the national curriculum framework. The framework includes children between the ages of birth to six-years and endorses play and relationships as contexts which support children to develop as confident and competent learners. *Aistear,* identifies the knowledge and understanding, skills, dispositions, attitudes and values children learn and develop across the early years. Learning aims and goals are presented through the four integrated themes of wellbeing, identity and belonging, communicating and exploring and thinking [32]. It is a holistic and integrated curriculum framework which sees children learning and developing many things all at once and places equal emphasis all aspects of development. As a flexible and emergent framework, it lends itself to the type of individualised approach which is a marker of effective inclusive education [7]. The *Guidelines for Good Practice*, accompanying the framework support early childhood teachers developing pedagogical strategies which foster the belonging and meaningful inclusion of children requiring targeted prevention and early intervention measures.

Síolta (translates as 'Seeds' from the Irish language) [32], is a quality and self-evaluation framework designed to be used in conjunction with *Aistear* to improve the overall quality of service provision. While *Aistear* is concerned with curriculum and the quality of the learning experience, *Síolta* is concerned with broader aspects of service quality. As working with both frameworks can been challenging, the NCCA

has developed the *Aistear-Síolta* Practice Guide, an on-line tool designed to support teachers using both *Aistear* and *Síolta,* together, in a practical way, to develop high-quality practice [34].

The specific reference to *Aistear* by the IDG in 2015 consolidated the expectation that the four interconnected themes of wellbeing, identity and belonging, communicating and exploring and thinking applied equally to all children. Given that *Aistear* will shortly be 15 years published, the NCCA has undertaken a review of the framework. Consultations with a range of stakeholders, including children, are ongoing and the updated framework will reflect recent societal and economic changes, workforce development, current policy directions, and the up-to-date evidence on young children's development and learning [35]. Moreover, the updated framework will align with the recently published Primary Curriculum Framework for Primary and Special Schools [36]. Initial findings from the consultations [37] indicate that the national curriculum framework is working well in supporting services to provide high quality education and care. Data from the consultations suggests a need to reflect on how inclusive the framework is, in its current form, and that there is scope for it to align more with recent policy developments in mitigating against exclusion and marginalisation, and in promoting the meaningful access and participation, of all children.

3.1.2 The physical environment

Research highlights that the early learning environment impacts on child outcomes [22]. In Ireland, the *Childcare Act 1991* (Early Years Services) *Regulations, 2016* [29, 30]; *Aistear* [31] and *Síolta* [32], all endorse the importance of the early learning environment. The physical environment, in preschools, is highly regulated and settings must be appropriate and safe for both children and staff. The statutory regulations [28, 29] set out requirements in relation to the structure of the premises, storage, lighting, heating, ventilation, cleaning and hygiene; maintenance and repair; waste disposal; and sanitary facilitates. They also set out minimum space requirements—a minimum space/area requirement of 1.818 m^2 per child currently applies [11]. Under these regulations [29, 30], preschools are required to provide safe and appropriate facilities for children to rest and play. Play opportunities need to be available indoors and outdoors and necessary adaptions must be made to ensure children with diverse needs can fully access the outdoor learning environment [11]. According to the latest figures from Pobal, 97% of early years settings reported having an outdoor space. Moreover, 81% of services reported that their premises was accessible to wheelchair users [13]. Under the regulations it is expected that all children will have adequate, accessible, safe and stimulating resources to play and learn with and that their identities will be reflected in the resources available. Where children use individualised adaptive equipment (i.e. augmentative communication devices), preschools are required to use these appropriately to support wellbeing, learning and development [11].

Under Level 5 of the AIM, at **Figure 1**, preschools can apply for funding towards minor alterations to, and for access to, specialist equipment [13]. Pobal data indicates that in 2020/2021, 223 children availed of AIM support at this level. In June 2019, the Department of Children and Youth Affairs and the Centre for Universal Design (CEUD) at the National Disability Authority launched the *Universal Design Guidelines for Early Learning and Care Settings* [38]. Universal Design involves the creation of environments which allow for the full participation and engagement of all children

and adults. The guidelines provide guidance on the refurbishment, renovation and building of early years services in Ireland. They include a self-audit tool which early years services can use to evaluate the accessibility of their learning environments. Overall, the guidelines help to ensure that the early learning environment responds to individual physical, psychological and emotional needs.

3.1.3 Group size and ratios

Low child-teacher ratios and smaller group sizes have been shown to enhance the quantity and quality of teachers' interactions with children, in the early years [25]. Similar to the physical environment, preschool group size and ratios are also highly regulated in Ireland. The current teacher-child ratios for the ECCE programme are 1:11 while the maximum number of children that can be catered for in one room is 22 [11]. Under AIM Level 7 support, preschools can apply for additional assistance in a preschool room to support the inclusion of a child identified as requiring more targeted support measures. Reflecting a whole-setting approach, additional assistance, rather than being for an individual child, is provided to reduce the overall teacher-child ratio in the preschool room [4]. 2855 or 2.7% or children enrolled in the ECCE programme accessed AIM Level 7 support in the year 2020–2021 [13].

3.1.4 A qualified and competent workforce

Central to a high quality inclusive preschool system is a qualified and competent workforce [3]. In Ireland, those working in the preschool sector reflect considerable diversity in terms of their experience and qualifications. While historically the sector lacked any minimum qualification requirement, since 2016 all preschool teachers must hold a minimum Level 5 major award in ECCE (on the National Framework for Qualifications (NFQ). Under the contractual requirements of the ECCE programme, preschool lead teachers must hold a minimum Level 6 major award in ECCE and preschools can also apply for higher capitation where lead teachers have a major award at Level 7, or higher [3].

In Ireland teacher preparation programmes in ECCE are offered across a range of further and higher education institutions. Standardising programme content, across different providers, was identified as a significant step in the development of the workforce. The *Professional Awards Criteria and Guidelines (PACG) for Initial Professional Education (Levels 7 and 8) Degree Programmes for the Early Learning and Care (ELC) Sector in Ireland* and the *Professional Award-type Descriptors (PATD) (Level 5 to 8) Annotated for QQI ELC Awards,* now function to reduce the variability of experience across different programmes [39, 40].

To establish the qualified and competent workforce needed to deliver high-quality inclusive preschool education, the Government funded the Leadership for INClusion in the Early Years (LINC) Programme (a special purpose award located at Level 6 on the National Framework of Qualifications (NFQ), Quality and Qualifications Ireland 2023). The LINC Programme was developed and first delivered by the LINC Consortium (Mary Immaculate College, Early Childhood Ireland (ECI), and Maynooth University (MU)—Froebel Department of Primary and Early Childhood Education) in 2016. Through this AIM Level 1 universal support, early childhood teachers are empowered to develop innovative solutions to promote the wellbeing of learners requiring targeted prevention and early intervention measures and to ensure that they are enabled to achieve their full potential. To date over 5000 early childhood teachers have completed the programme

and have qualified to become inclusion coordinators (INCOs). The interim and end-of--year-four LINC programme evaluations indicate exceptionally high overall satisfaction levels with the programme, suggesting that this innovative model is impacting positively on the quality of inclusive culture, practice, and pedagogy in preschools [3, 41, 42]. Building on the LINC programme and graduates' requests for further professional learning opportunities, a complementary free professional learning programme, LINC+ launched in 2021, for LINC graduates working as INCOs. In line with national and international literature on quality preschool education, the LINC+ programme has a strong focus on developing teacher communities of practice. Overall LINC and the LINC+ programmes provide an evidence-based and cost-effective approach to the continuing professional learning of early childhood teachers with the net effect of improving the preschool experience for *all* children [3, 41, 42].

Under AIM Level 1 universal supports, early childhood teachers can also avail of a programme of professional learning in Equality, Diversity and Inclusion. This free programme supports teachers embedding the *Diversity, Equality and Inclusion Charter and Guidelines for Early Childhood Care and Education* [43], in practice. Under AIM Level 3, the Early Years Learning and Development Unit of *Better Start, The National Early Years Quality Development Service* established initially in 2013 by the Department of Children and Youth Affairs (DCYA) (now the Department of Children, Equality, Disability, Integration and Youth (DCEDIY), offers a suite of continuing professional learning opportunities for early childhood teachers to develop their competence in creating inclusive early childhood experiences for all children. These include the Hanen 'Teacher Talk' programme, the 'Lámh' (translates as 'hand' from the Irish) sign language system used to support communication for those with speech language and communication needs (SLCN), and SPEL-Sensory Processing E-Learning programme [44]. Better Start also provides a Quality Development Service (QDS) to provide coaching and mentoring for preschool settings in the implementation of *Síolta* and *Aistear*.

In *First Five Whole of Government Strategy for Babies, Young Children and their Families 2019–2028* [18], the transition to a graduate-led early years workforce, a national model of continuing professional learning, and clearly defined career pathways, are identified as powerful enablers of high-quality early childhood education [13, 45]. This aligns with the view that teacher education is a reliable indicator of quality [19, 22]. The government launched two reports in December 2021—'*Partnership for the Public Good—a New Funding Model for Early Learning and Care and School-age Childcare* and '*Nurturing Skills' The Workforce Development Plan for Early Learning and Care and School-age Childcare 2022–2028* [46, 47]. Following the establishment of a Joint Labour Committee (JLC) to address pay and conditions in the early years sector, in 2022, two new *Employment Regulation Order (EROs)* set out minimum pay rates and terms and conditions of employment for early childhood teachers [48]. Despite the introduction of the EROs and a new funding model, teacher wellbeing, status, and renumeration, remain significant challenges for those working in the sector [49]. Invariably, this perpetuates ongoing recruitment issues and undermines efforts to sustain the quality of the preschool system.

3.2 Process quality

To raise the quality of preschool education, investment in, and regulation of, structural quality clearly needs to translate into tangible enhanced process quality, namely high-quality interactions and learning experiences. A large corpus of international research has shown that positive interactions and an appropriate

programme of learning experiences impact positively on children's overall wellbeing and development [8, 21, 22, 24].

While in Ireland the Tusla inspection process ensures compliance with the minimum standards required to protect children's health, safety and well-being, the Inspectorate of the Department of Education has assumed responsibility for evaluating the quality of education processes in services participating in the ECCE programme [10, 50]. In 2022, the inspection remit of the Department of Education Inspectorate was extended and now includes babies, toddlers and young children. In addition to evaluating the quality of processes to support children's learning and development, the Quality Framework for Education-focused Inspections (EYEI) also evaluates: the quality of context to support children's learning and development; the quality of management and leadership for learning; and the quality of children's learning experiences and achievements [10]. Within each of these prime areas, there are a number of specific outcomes, each of which are accompanied by more specific signposts for practice. Both the Tusla and Department of Education inspection processes maintain a "focus on process quality, self-evaluation and inspection for improvement" ([14], p. 217).

Recent policy developments recognise that a high-quality preschool system must go beyond inspection and evaluation and include support for settings to improve the standard of provision. In this context *Better Start, the National Early Years Quality Development Service* works with early years services supporting children from birth to 6-years to improve the quality of inclusive provision. In line with the research which suggests that on-site continuing professional learning is particularly powerful in raising quality [22], *Better Start* provides mentoring and coaching for individual settings which is facilitated by its early years specialists (EYS). Better Start EYS work closely with *Síolta*, *Aistear* and the *Tusla Quality and Regulatory Framework* to develop high quality practice in early years settings. Data from the 2020/2021 Pobal Annual Early Years Sector Profile reports that AIM Level 4 support and mentoring was accessed by 1671 early years services [13]. The foci of the inspection frameworks in Ireland together with Better Start's Quality Development Service, Early Years Learning and Development and Access and Inclusion Model emerge as facilitators of process quality through their foci on interactions; children's programme of activities, self-evaluation and reflection, and the promotion of the concept of the agentic child (see **Figure 3**).

3.2.1 Interactions

Interactions include those between teachers and children; between children themselves; between teachers and parents-carers; and between the setting and the community. High quality interactions between teachers and children involve the provision

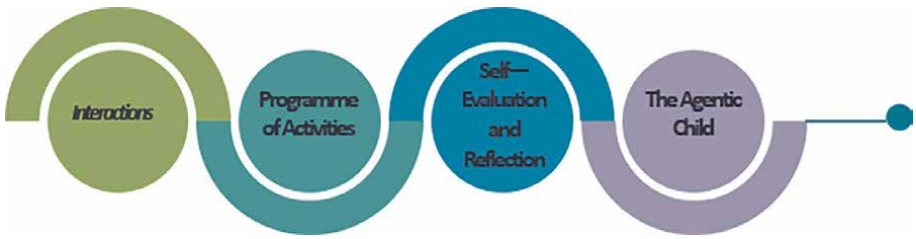

Figure 3.
Measures supporting process quality.

of emotional warmth and security, in addition to suitable levels of cognitive challenge. Findings from the UK Effective Provision of Preschool Primary and Secondary Education (EPPSE) project, for example, indicate that high-quality preschool settings were characterised by interactions that also supported sustained shared thinking (SST), which involves two or more people working together to solve a problem or expand upon an idea [8]. Moreover, the CARE research project, conducted across a number of European countries, found that dyadic teacher-child interactions could to be complimented with more of a focus on the group of children themselves, as a community of learners [51]. This aligns with findings from a number of studies, the authors have been involved in, which underscore the importance of interactions with peers for children receiving targeted prevention and early intervention measures [41, 42, 52–54]. Using multimodal means of representation, young children consistently articulated that opportunities to learn and play with their friends is one of the most important things about their preschool experience.

Bronfenbrenner's Bioecological Model of Child Development conceptualises the child at the centre of an intricate and interconnected system and considers the quality of the interactions between the child' family, educational setting and community as decisive for development [2, 55]. Collaboration with families is deeply embedded in *Aistear* [31]. Parents-carers are recognised as the child's primary educators and congruent with the international research, the significance of the home learning environment, and of continuity across home and preschool, is acknowledged [56, 57]. Children are happier, more motivated and engaged in their learning when parents-carers support their learning across home and preschool. Moreover the regulations set out the requirement that information is shared with parents in relation to their children's wellbeing and learning [13]. *The Diversity, Equality and Inclusion Charter and Guidelines* [43] further endorse the need for preschools to work closely with families to meet the learning needs and interests of their children.

Moving towards 'connective professionalism' has been identified by the Centre for Education Research and Innovation (CERI), at the OECD, as crucial to the future of teaching [58]. Realising this 'connective professionalism' in the early years can be particularly powerful for children's wellbeing and development. Such collaboration can ensure that children receive timely intervention in addition to supporting information sharing and capacity building. Preschool teachers have a wealth of knowledge on individual children's learning journey's which can inform specialised interventions, when needed. Given that public access to speech and language therapy and occupational therapy services remains' problematic, in September 2019 the Departments of Education and Skills, Children and Youth Affairs and Health, launched the *In Preschool and In-School Therapy Demonstration Project* which was managed by the National Council for Special Education (NCSE). 150 preschools, primary schools, post-primary schools and special schools were involved in the pilot project. The project focused on developing a tiered model of therapeutic intervention, delivered to children in their educational settings. Findings from an evaluation of this project [54] suggest that it was successful in providing therapeutic support in early childhood settings. The evaluation reports: an increase in staff confidence and ability in the early identification of children requiring additional support; increased competence in modifying classroom environments and teaching approaches to provide for all learners; and an understanding of each other's (educators and therapists) roles in terms of supporting all children in early childhood education [54]. Unfortunately, while the In-school Therapy Project is continuing in 75 schools, it has been paused in preschool settings notwithstanding its promising outcomes.

The transition from preschool onto primary school can be a challenge for some children [59]. In a national study exploring teachers, parents and children's perspectives on school readiness, children through both their narratives and drawings indicated that primary school was perceived in terms of: "the size of the buildings"; the limited availability for play; the centrality of homework and the importance of making friends" [59, 60]. Effective transition practices involve planning and communication between all stakeholders. In collaboration with teachers in preschools and primary schools, the NCCA recently developed *Mo Scéal*: *Moving from Preschool to Primary* [61]. This online resource bank includes a range of information and resources which can be used during the child's transition, namely the *Mo Scéal* or 'my story' templates which tell the child's learning journey so far. There is no requirement to use *Mo Scéal* but use of the tool clearly supports quality development through building communication and collaboration with schools and families, to nurture a positive transition experience for all.

The Reggio Emilia preschool programme in Northern Italy, underscores the significance of the environment through referring to it as the child's "Third Teacher" [62]. The environment shapes children's learning experiences and can promote, more or less, feelings of belonging, interactions, autonomy, individual interests, and a range of thinking and learning behaviours [22].

3.2.2 Programme of activities

The content of children's preschool education has received much attention and reaching consensus around what children should learn during the preschool years remains challenging. The research in this area affirms the potential of playful emergent inquiry-based approaches which align with young children's learning needs and interests [23, 63, 64]. Moreover, longitudinal data such as that from the HighScope preschool curriculum comparison study, illustrate positive effects for a child-centred playful preschool curriculum through to adulthood [63]. Child-centred approaches have been found to propel the development of the whole child to an extent that those focusing on a narrower suite of academic skills, fail to do [23, 63, 64]. Taken together the research suggests that the quality of the programme of activities, or experienced curriculum, is supported when: it is guided by an evidenced-based national curriculum; affords teachers flexibility and autonomy to adapt to local needs and interests; focuses on developing the whole child; fosters integrated learning; is responsive to learner needs and interests; learning experiences oscillate between those which are child- and adult-led [21–23, 33].

Daily routines such as eating, resting and transitioning are core components of children's daily preschool experience and it is important that they are incorporated with, rather than being seen as separate to, the curriculum. Responsive daily routines are vital for wellbeing and development and provide valuable occasions for children to interact and learn with, their teachers and peers [22, 65].

3.2.3 Self-evaluation and reflection

Where high-quality preschool provision exists self-evaluation and reflection are firmly rooted in whole-setting and individual planning processes. Reflection has been described as "remembering with analysis' [66]. The emergence of self-evaluation as a concept can be traced to the school improvement movement in 80s, where schools examined their policies and practice with reference to the education of all leaners [67].

The 'self' in 'self' evaluation is associated with the teacher, learner or whole-school community. Both concepts are reflected in the principle of 'the teacher as researcher' as articulated in the philosophy of the Reggio-Emilia preschool programme [68]. Research has a particular meaning in this context related to intentional planning, observation in action of what has been planned, actively listening too children, reflecting on children's responses and using the reflections to make pedagogical decisions [69].

While there is a formal process for school-self-evaluation (SSE) in the Irish context, at preschool level, reflection and self-evaluation are encouraged as internal evaluation processes, which can be discussed during external inspections [10]. There is an explicit intention that the feedback from evaluation during inspection fosters professional reflection and internal evaluation, with the net effect of improving learning experiences and outcomes [10]. Research conducted by Daly and colleagues on educational provision for autistic children highlighted the progress in school self-evaluation processes at individual and school level with scope for further development at learner self-evaluation level [52]. Area 4. of the EYEI framework [10], which is focused on the Quality of Management and Leadership for Learning explicitly articulates an expectation that preschool settings, in line with *Aistear* and Síolta, engage in ongoing review, self-evaluation and reflection. These practices, in turn support the type of professional learning which impacts positively on the quality of practice.

3.2.4 The agentic child

High-quality preschool education promotes children's agency, viewing them as co-constructors rather than receivers of the curriculum. Chiming with the extensive research on child agency, Ireland has proactively pursued a children's rights agenda ratifying the United Nations Convention on the Rights of the Child (UNCRC) in 1992 and the UN Convention on the Rights Persons with Disabilities (UNCRPD) in 2018 [6, 70]. The ratification of these conventions and their prominence across macro-meso- micro-policy levels related to creating an inclusive preschool system signals a government commitment to recognising and actioning the rights to which all children are entitled. Article 12 of the United Nations (UN) Convention on the Rights of the Child (UNCRC) explicitly articulates the right of the child to have their opinions taken into account and their perspectives respected in decision-making which impacts upon them, while in Ireland, children's right to have their voices heard and allocated due weight is further acknowledged in the Irish Constitution [6, 71, 72]. Article 7 of the CRPD mirrors the provisions of Article 12 of the UN Convention on the Rights of the Child (UNCRC) (1989) [6], and extends the obligation to preserving the right of the child, with disabilities, to express their views freely on matters which impact upon them and ensuring that they receive appropriate support to realise this right.

Recent research conducted in the context of the evaluation of Phase One of the LINC programme explored children's encounters across three preschool settings in Ireland to develop an understanding of how children experience and perceive inclusion in their preschool environment [42]. The research employed an approach specifically to facilitate young children's participation developed by the authors – Exploring and Telling, which utilised video and a talking maths methodology [42]. **Table 2** provides a glimpse of children's activities with reference to Inclusive Culture; Inclusive Practice and Inclusive Pedagogy, suggesting that a focus on agency as a feature of provision is contributing to process quality.

Inclusive culture	Inclusive practice	Inclusive pedagogy
		
Obstacle course designed in a both a universal and targeted manner to accommodate the child's needs and those of all children in the setting.	Child supported in taking a break from activities and select his own favourite book to read.	The INclusion CO-ordinator uses a 'First and Then' card with the child to support the child's agency in engaging in activities.

Table 2.
Child agency across inclusive culture, inclusive practice, inclusive pedagogy.

4. Discussion and conclusion

High-quality inclusive pre-school education impacts positively on children, families and society, more broadly. High-quality programmes can have immediate and often longer-term benefits and can be most impactful for children considered at risk due to socio-economic disadvantage and/or children requiring targeted prevention and early intervention [21, 22, 73]. In a relatively short time, through a commitment to investment that focuses on structural and process aspects of quality across macro-meso-micro policy levels, Ireland has made significant progress on the path to developing a high-quality inclusive preschool system and in effect creating a preschool system where diversity becomes the norm [3]. The ongoing concern to reduce policy fragmentation through adopting cross-government approaches and the commitment in *First Five: A Whole of Government Strategy for Babies Young Children and their Families* [74] to considering how AIM can be enhanced or expanded to include, for example, all early learning and care services, school-aged childcare services, and children with additional needs other than those with a disability, based on relevant developments and evaluation findings is indicative of a proactive dynamic government response.

However, challenges remain with recent research suggesting that re-calibrating the focus of how inclusion is conceptualised to reflect the diversity of early childhood settings is timely in view of our developing understandings of difference and the move from a medically driven-deficit to a strengths-based approach that frames inclusion as a rights issue [43]. There is potential to extend the current AIM to provide for the equal participation of all children based on the principles of progressive universalism thereby ensuring the availability of high-quality inclusive preschool education with targeted prevention and intervention measures in place for the cohort of children for whom this is required. Acknowledging that ultimately, the quality of teaching remains the pre-eminent influence on a child's outcome [75], the provision of multi-professional/agency support to facilitate transdisciplinary/transagency working, equity in professional learning opportunities, pay and conditions and funding mechanisms will ultimately be the determinants of how far the Irish system progresses on its path towards creating a high-quality inclusive preschool system.

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Chapter 3

How to Prepare for the Transition from Preschool to School: From Policies to Practices in Norway

Aihua Hu

Abstract

Transition from preschool setting to formal schooling is seen as one of the most important transition in one's life trajectory, which may influence many people's future transition experiences. Research has confirmed that if children are prepared for school life from different perspectives when they enter formal schooling, they are more likely to succeed at school and in future life. This chapter uses Bronfenbrenner's ecological theory to present how the different environments influence children's transition with kindergartens' roles and practices being the focus. By doing so, this chapter aims to inspire better policies and practices concerning transition in Norway and beyond.

Keywords: ecological theory, kindergarten, Norway, primary school, transition

1. Introduction

Research has confirmed that if children have a successful transition experience when they enter formal schooling, they are more likely to succeed at school and in future life. Transition can be challenging for many children, as they are experiencing dramatic changes [1]. Importance has been attached to providing smooth and good transition experiences for children at policy level internationally, which is most obvious through looking at national preschool curriculum guidelines. The great majority of countries around the world that have national preschool curriculum guidelines have a chapter/section stipulating how to provide smooth and good transition experiences for children. Norway is no exception. "Transitions from kindergarten to primary schooling has moved up the Norwegian policy agenda in recent years" [2]. Transition from kindergarten to primary school has received considerable attention in the past decade in Norway and is dealt with in different reports and white papers to parliament [3]. There has been discussion on who should be ready in this transition process. Previously emphasis has been on children's readiness for school. UNICEF [4] uses the term school readiness which includes children's readiness for school, school's readiness for children, and families' readiness for school to provide a systematic framework for transition preparation. Research has documented the importance of readiness of all key stakeholders to ensure good transition experiences for children. This has provided the rationale for choosing the focus of this study.

The major goal of this chapter is to explore how national and local policies on transition from kindergarten to primary school are implemented at practical level through a case. In this chapter, the terms kindergarten and preschool are used interchangeably referring to the period before formal schooling. There is a Norwegian term—førskolebarn[1] for children who are going to primary school. This term will be used throughout this chapter.

Children in Norway start school in August of the year when they turn six as a result of Reform 97,[2] which has influenced children's adaptation in transition period. Before 1997, children started compulsory education at the age of 7. Reform 97 aims to unify primary schooling and junior secondary schooling and to be consistent with senior secondary school reform in 1994. It is mandatory for all children aged 6–16 to attend school which is called grunnskole in Norwegian. These 10 years are divided into two levels, the first 7 years are called barneskole in Norwegian and the rest 3 years are called ungdomsskole.

Norwegian children are entitled to a place at kindergarten when they turn one-year old no later than the end of October of the year that they apply for the place. Almost all kindergartens are mixed aged, with children aged one to three being placed in one group and children aged two and a half to six in one group. Some kindergartens place children into three groups one to two in a group, three and four in a group, and five to six in one group.

2. Theoretical framework

Transition in this chapter is seen as an important development and change process in children's life trajectory, which is influenced by the multiple environments that children are in. Yelverton and Mashburn [5] conclude in their research "that children's experiences of the Kindergarten transition are affected by the characteristics of children themselves, their educational settings, the large-scale systems that support children's educational experiences, and the way each of these is dynamic over time", which provides rationale for utilizing Bronfenbrenner's ecological theory—which stresses the importance of studying children in multiple environments. Additionally, the Norwegian national framework plan for kindergartens also emphasizes the importance of collaborations and communications of different environments that directly influence children's transition.

Bronfenbrenner's ecological theory [6] which emphasizes the importance of studying children in multiple environments has been extensively used to explain how the inherent qualities of children and their environments interact to influence their growth and development. According to Bronfenbrenner's ecological model, children's lives are influenced by five ecosystems namely microsystem, mesosystem, ecosystem, macrosystem, and chronosystem and each of these five interact with and influence each other.

The microsystem is the most immediate environment in which children live, comprising the daily home, school or kindergarten, peer group, and community environment of the children. The mesosystem is the interaction and linkages among the different environments of microsystems. The exosystem is the linkages that exist between two or more environments, one of which may not contain the developing

[1] Both the singular and the plural forms are the same in Norwegian.

[2] More in formation about the reform can be found here: St.meld. nr. 21 (1996–97)—regjeringen.no.

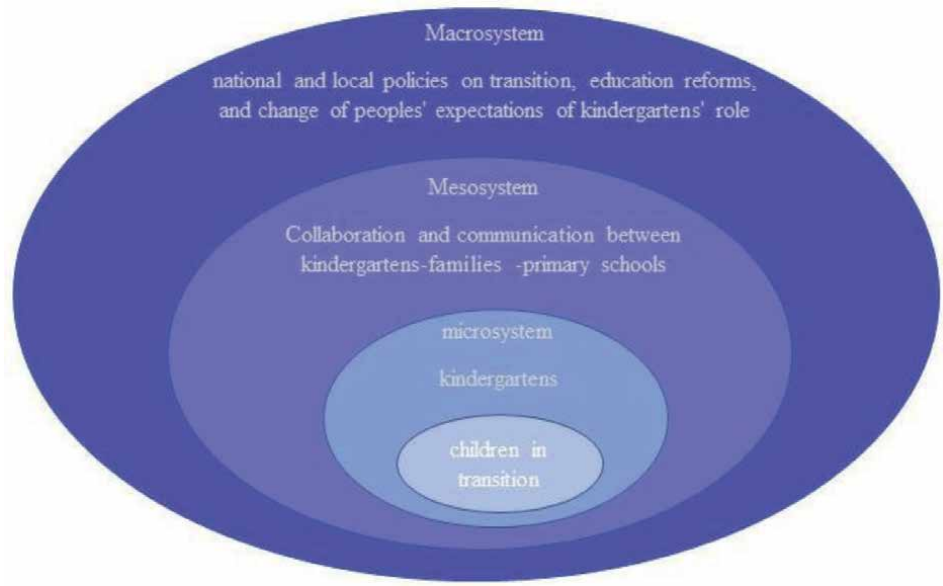


Figure 1.
Theoretical framework adapted from Bronfenbrenner.

child but influence them indirectly. These environments can be the workplaces of the child's parents, extended family members, and the neighborhood the children live in. The macrosystem encompasses the children's cultural patterns and values, specifically their dominant beliefs and ideas and political and economic systems. The chronosystem is the time dimension, including the influence of both change and constancy in the child's environment. This chapter has adapted this theory and only three systems namely microsystem, mesosystem and macrosystem are included. **Figure 1** illustrates the environments that are discussed in this chapter. In the macrosystem, social and education policy landscapes in relation to transition are first presented. Collaborations and communications between kindergarten and family, as well as kindergarten and primary school are presented in mesosystem. Practices of kindergarten are introduced in microsystem.

3. Research design

This chapter presents a case study of a larger cross-cultural research project that studies the transition from preschool to school by investigating the perspectives of leaders and teachers in kindergartens and schools. This case study is an instrumental case study and is used to understand the reality of how policies on transition from preschool to school are implemented in Norway.

3.1 The case

The case kindergarten is located in a municipality made up of different islands on the west coast of Norway. The local government has constructed three different projects to have a coherent line for the 10-year compulsory education. And the project for the first 4 years of primary school is called the Incredible Years which is

also applicable to the eldest children at the kindergarten. The present municipality transition framework plan took effect in 2013 which applies to both kindergartens and primary schools. All kindergartens in the municipality design their own educational activities for the eldest children in the kindergarten following both national and the municipality framework plan. And the case kindergarten is of no exception.

The case kindergarten has four groups of children with one group of children aged 1–3 and three groups of 2.5–6 years old. Children in this kindergarten go to two neighboring primary schools, one of which is a block away from the kindergarten. Each year, the number of children who go to primary school varies.

3.2 Data collection and data analysis

Policy documents and a follow-up interview are major data sources. Documents include government policies at national and municipality levels and are used to place the study in context, prepare for data collection, and supplement interview data. An in-depth interview was conducted with the kindergarten teacher who is responsible for Dinosaur school to solicit her opinions and experiences. She was asked to be interviewed because she is the teacher with the longest experience working with the eldest in the kindergarten and can provide rich information.

Data analysis went through two main stages. The first stage was document analysis and the second one was analyzing interview data. Both were deductive analyses following Bronfenbrenner's ecological theory.

4. Findings and discussion

4.1 Macrosystem: Social and education policy environments

National framework plan for kindergartens is guidelines for counties, municipalities, and kindergartens to create their local curriculum. In the latest framework plan, the transition is discussed as an independent chapter (Chapter 6) while in the previous version, it was mentioned under the section on collaboration with the primary school in Chapter 5, which can be seen as a sign of the government's recognition of the importance of transition. The chapter dedicated to transition stipulates the transition from home to kindergarten, transitions in kindergarten, and transition between kindergarten and school. This chapter recounts how transition between kindergarten and primary school should be. In the framework plan, there are two main requirements for kindergartens namely kindergarten should collaborate with parents and primary schools and kindergarten should ensure a good foundation and motivation among children for starting school through different approaches. The framework plan indeed provides a framework and local governments and kindergarten make their own detailed policies and curriculum according to their circumstances. "There is a long-standing tradition of local self-government and decentralisation which also applies to the early childhood education and care (ECEC) sector" [1]. Based on the stipulation in the framework plan, different counties especially municipalities have constructed their own more detailed framework plan for transition between kindergarten and school.

The 20-page Framework Plan of the case municipality details the aims of the plan, the annual plan for the transition, five development domains of children in the last year of kindergarten and first year of primary school, competences that pupils

of second year should develop, different forms for information exchanges between kindergartens and primary schools, and information of different projects that aim to make preschool education and primary school education consistent. Both kindergartens and primary schools should use the transition plan as a reference to construct their daily activities. And they need to communicate with each other and go through collaboration initiatives according to different needs in the early spring of the year.

All førskolebarn go to Dinosaur School in their last year at kindergarten as part of the curriculum. Therefore, no extra fee is charged to parents. The Dinosaur School is a project initiated by a university in Norway. Not all municipalities/kindergartens across Norway utilize it. Each session lasts 45 minutes and in total there are about 60 sessions. Usually, the førskolebarn go there once a week for two sessions and it is up to the kindergartens to decide the frequency. The location of Dinosaur Schools varies from municipalities to municipalities, with some in kindergartens, some in primary schools or in folk schools of the municipality. In the case kindergarten, the teaching is conducted in the folk school and the kindergarten teacher and the children walk there each time. The aims of the Dinosaur school are to strengthen children's social and emotional competences, especially in terms of recognizing and understanding emotions in oneself and others, taking others' perspectives, developing skills in problem-solving and conflict management, emotion control, empathy, self-confidence and self-control. The themes are built on The Incredible Years. The contents are based on six stories of three cartoon figures where children can explore topics about emotions, communication, relations, and conflict resolution based on everyday problems. Each of the six stories has a theme that is discussed during the teaching. Activities are organized more or less like the teaching activities in primary schools, that is, classroom teaching followed by different activities in small groups. At the same time, teachers utilize practice-oriented methods such as the use of large hand puppets, conversations about video clips, role-plays and games, as well as other various activities related to the theme. Besides, children are given some tasks to accomplish with their parents at home, which also aims to establish close collaboration between kindergartens and parents and inform them of the different topics that children have learned at Dinosaur school[3]. The number of children in each class varies depending on how many førskolebarn there are that year and on average there are around 20 children in each class. The children are from the nearby kindergartens and they usually will go to the same neighboring schools. Kindergarten teachers of the children in the class take turns to teach in the Dinosaur school.

Additionally, the case municipality initiates different joint projects for kindergartens and primary schools to ensure that children will not feel insecure or strange when they go to primary schools. Starting in 2019, the municipality makes use of the culture schools to create joint music and drama projects between kindergartens and schools.

In general, the transition from kindergarten to primary school in Norway is unproblematic for most children [7]. And they can adapt to primary school life in about a month's time and some may need just a week or two to get used to school life. At the same time, some have problems. According to the interviews with six teachers from three primary schools conducted by the author, the common problems are lack of pre-academic knowledge, lack of self-care skills e.g. not being able to go to the toilet on their own, not being able to dress themselves, lack of sense of security because of leaving the familiar environment and people and friends, lack of social skills to make new friends, and not being able to listen to the teachers and take turns to do things.

[3] More information about Dinosaur school can be found here: https://dua.uit.no/skole-barnehage/.

4.2 Mesosystem and microsystem: Kindergartens as the coordinative and active actors

This part presents how the Framework plans at national and municipal levels are carried out in practice with a focus on kindergarten's roles and practices.

4.2.1 Involving and communicating with parents

Parents are involved in this transition year by doing tasks given by the teacher at the Dinosaur school together with their children. Kindergarten teachers also encourage parents to talk with their child what they have learned at Dinosaur school before doing the tasks together. Besides this, kindergarten teachers also work with parents to train children's executive skills and inform parents of the importance of being consistent in their practices.

Additionally, kindergarten teachers make use of different opportunities to communicate with parents about their children. There are documentation and forms kept by teachers about the children and their development. The teachers need to get parents' permission to share children's information with primary schools and especially need to communicate with parents about what information they want them to share with primary school teachers. Please find the forms that parents/guardians need to sign in Appendix.

Traditionally, early childhood education and care in Norway adopts social pedagogy tradition and focuses primarily on social skills and care. This has some changes in recent decades, with a shift in policy focus on learning and its outcomes [8]. Kindergartens are referred to as learning organizations in the national framework plan for kindergartens [9], which did not appear in the previous national framework plan. Besides, with kindergartens having more educated staff, parents' expectations of kindergarten are also under change. They now expect kindergartens to teach and prepare their children for primary school in addition to care. Furthermore, they hope that kindergarten teachers can pass on their knowledge and the documents they have kept about their children to primary school teachers so that the primary school teachers know their children and prepare accordingly to teach.

4.2.2 Communicating and collaborating with primary schools

As mentioned above, in early spring every year, the kindergarten and primary school sit together to go through their collaborative tasks which vary according to the needs of the year. Every May, kindergarten teachers usually the lead teacher of each group visit the two primary schools to share the information of individual children who are going to school in August. As mentioned above, whether to share and what to share with primary school depend on the willingness of parents. More and more parents want kindergarten teachers to share their children's information with primary school in the hope that teachers can be better prepared to teach their children.

Besides sharing information, kindergarten teachers and primary school teachers communicate about using the same or similar languages to communicate with and instruct children so that children will not feel at a loss when they sit in primary school classrooms. For example, when asking children to raise their hands, the kindergarten teacher used to say "en stille hånd" while the primary school teacher usually says "rekk opp hånda". Now the kindergarten teachers in this case also use this expression.

Every May or June depending on the negotiation between the kindergarten and the primary school, children are taken by the kindergarten teachers to the primary school they are going to the following semester to get familiar with the schoolteachers and leaders as well as the environment. In some kindergartens, the førskolebarn may go to different primary schools in the neighborhood which is also why kindergartens and primary schools have to arrange the time in advance. During the visit, førskolebarn visit the classrooms and sit in the class for around 20 minutes. They play in the playground. Since the case kindergarten is very near to one of the schools where some of the children are going, they go and play there quite frequently. They greet teachers and students there whenever they pass the school.

The kindergarten and the primary school have a joint music program, which is initiated by the municipality and held in the folk school. Every week, the førskolebarn join the primary school choir where they sing together. The joint project ensures that kindergarten children have contact and establish relationships with older school children. Doing activities with primary school also bestows on children a sense of belonging to the school.

Furthermore, primary school teachers may be involved in the Dinosaur school when there is any child with special needs. They sit in the classroom and observe the child(ren)'s behaviors and performances so they know what to do when the child(ren) is /are in their classroom.

4.2.3 Preparing children for primary schooling

Besides involving, communicating and collaborating with parents and primary schools, the kindergarten carries out different activities to prepare children for their primary schooling.

The kindergarten helps children to master social skills such as how to be polite to others, how to talk with others and how to make friends. Once a week, kindergarten teachers organize all the last year's children for an outing activity through which they can socialize, establish and enhance friendships so they will not feel alone in primary school. It is the kindergarten's or Norwegian belief that outdoor activities promote children's cognitive development, which has evidence support as well. The Dinosaur school is another bigger arena for them to meet more of their peers because all the children of the nearby kindergartens who are going to primary schools go to the same dinosaur schools.

Kindergarten teachers purposely encourage children to share and practice what they have gained in Dinosaur school in kindergarten. For example, some children teach the younger children that "I can be angry, but I can also calm down". The practices are in line with the goals of the Incredible Year Project that children can teach others what they have learned.

Kindergarten teachers motivate children to be interested in learning letters and numbers by putting them on the walls and talking about them from time to time. They motivate more able children by challenging them for example asking those who are able to read stories for other children. They help children to develop at their own pace. At the same time, they make sure that all children know and recognize their own names.

Additionally, kindergarten teachers help children to establish some good learning habits. They train children to concentrate on one thing at a time and listen to people who are talking. If the children are interested in writing, they show them the correct pen grip. Moreover, they act as role models to children on how to write and where to start on a piece of paper.

Though they train children's ability to take care of themselves throughout the kindergarten years, kindergarten carries out more intensive training on self-care

among the last year children. For example, they need to be able to take care of their own things and go to the toilet independently.

4.2.4 Challenges

There are different challenges that kindergartens face in helping children enjoy a smooth and good transition. Two are more obviously mentioned by the kindergarten teacher. One is the time issue. In the past, the kindergarten invited schoolchildren to their kindergarten to share and read for children who were going to school the next year. However, because of the tight schedule, they have stopped this practice. Accoridng to the kindergarten teacher, this practice generated interest and motivation among children to start primary school.

The other challenge is about getting information from primary schools especially who are going to teach the first year. Children and parents are eager to know who will teach their children, which will give them a sense of security. However, it is not always easy for primary schools to make the decision and incidents happen. The teacher felt it a pity that nothing can be done at this moment to tackle these two issues.

5. Summary and concluding remarks

Transition from kindergarten to primary school is one of the most important life trajectories for people. It is of great significance to ensure a smooth and good transition experience for young children. This chapter aims to explore how national and local policies on transition from kindergarten to primary school are implemented at a practical level through a case. This case study has indicated that macrosystem that dictates the policy landscape for children's transition affects kindergarten practices in the form of guidelines at national and local levels. The Dinosaur School project initiated by the municipality in their local transition policy document is well received by kindergarten teachers, primary school teachers and parents. The mesosystem consisting of collaboration and communication between kindergartens and families, kindergartens and primary schools has a direct and significant impact on children's transition experiences while kindergarten as one of the key environment shoulders important role in the coordination of collaboration between kindergartens, schools and families. Joint projects between kindergartens and primary schools are especially thought highly of by teachers of both parties.

The transition projects of the given case in this chapter has been carried out for 7 years and has been well received by both kindergarten teachers and primary school teachers. The survey conducted by Rambøll [10] has indicated that many kindergartens have substantial local freedom to decide the transition activities and to adapt the Framework Plan to local conditions and needs. The measures taken have in various degrees helped ease the strangeness and anxiety as a result of the transition for children. There are no universal best practices applicable to all kindergartens in Norway or all cultures. However, there are some good practices that can inspire better practices and the case presented here can be of some inspiration.

Acknowledgements

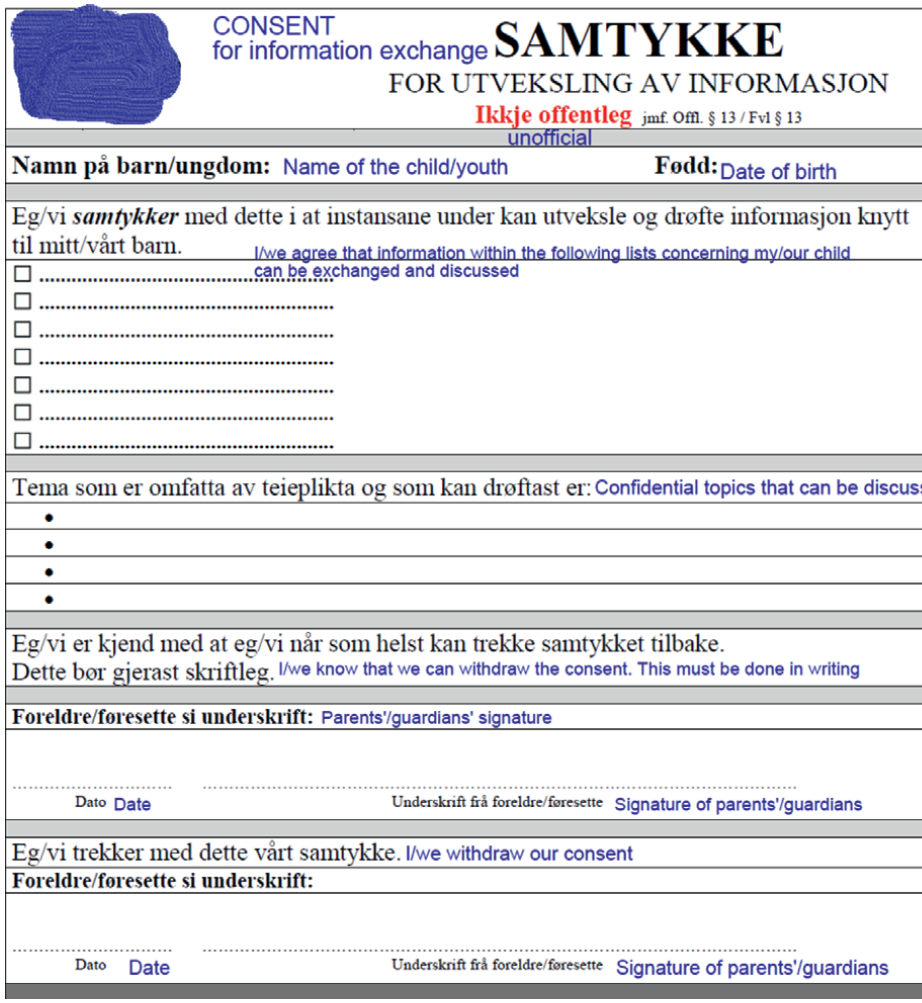
This research was supported by Western Norway University of Applied Sciences [Project number: 2910015]. The author wants to extend her gratitude to KINDknow

center and all her colleagues at the center and BLU for their generous support in the research process. Thanks also go to all the participants in the research.

Conflict of interest

The authors declare no conflict of interest.

Appendix



CONSENT
for information exchange **SAMTYKKE**
FOR UTVEKSLING AV INFORMASJON
Ikkje offentleg jmf. Offl. § 13 / Fvl § 13
unofficial

Namn på barn/ungdom: Name of the child/youth **Fødd:** Date of birth

Eg/vi ***samtykker*** med dette i at instansane under kan utveksle og drøfte informasjon knytt til mitt/vårt barn. I/we agree that information within the following lists concerning my/our child can be exchanged and discussed

☐ .....
☐ .....
☐ .....
☐ .....
☐ .....
☐ .....
☐ .....

Tema som er omfatta av teieplikta og som kan drøftast er: Confidential topics that can be discussed

-
-
-
-

Eg/vi er kjend med at eg/vi når som helst kan trekke samtykket tilbake.
Dette bør gjerast skriftleg. I/we know that we can withdraw the consent. This must be done in writing

Foreldre/føresette si underskrift: Parents'/guardians' signature

....
Dato Date Underskrift frå foreldre/føresette Signature of parents'/guardians

Eg/vi trekker med dette vårt samtykke. I/we withdraw our consent

Foreldre/føresette si underskrift:

....
Dato Date Underskrift frå foreldre/føresette Signature of parents'/guardians

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Chapter 4

Preschool Improvement Practices

Anna Katharina Jacobsson

Abstract

Early childhood education and care (ECEC) are current interests in many countries following international studies that show the importance of children starting their early years within a high-quality education and caring environment, which include health and well-being. This chapter is based on an action-research study, where four preschools explore the children's and preschool staff's experiences of activities that create recovery. The aim was: *How can the theory of practice architecture be used to understand preschool staff and children's experiences of activities that provide well-being, and what promotes alternatives hinder the process?* With the support of practice architecture, arrangements have been made visible that promote or hinder the preschools' work towards creating learning environments and activities that contribute to recovery The practice is shaped by the cultural-discursive, material-economic, and social-political arrangements that frame the practice and constrain or enable it. The result shows for instance that knowledge and a shared understanding of phenomena are necessary for the process, and that planned actions could be hindered by work environment laws and employee absences. The children's input about recovery and what they liked or disliked gave insights into how the preschools could arrange activities catering to different needs and wishes.

Keywords: ECEC, well-being, action research, practice-architecture, school improvement

1. Introduction

Early childhood education and care (ECEC) have been of global interest for years, according to Karila [1]. Kalicki and Koening [2] suggest that the post-PISA debates trigger it, and it is focused on European education policy. Researchers argue that there is growing pressure on educational outcomes, even for young children [3].

ECEC is a critical learning environment for children and is of great value for both short- and long-term development, including learning, health, and well-being [4]. Children spend much time in preschool and childcare, and interest in children's well-being has increased in political, social and educational contexts [5] and Moss [3] argue that there is pressure on educational outcomes, also for very young children. Previous studies have shown that well-being has many positive consequences, such as good health and effective learning [6, 7]. Mashford-Scott et al. [8] and Coverdale and Long [9] show that children experience quality of life and well-being as a means to healthy development. The researchers define well-being as a subjective, inner sense of "well-being".

The agency child construction has emerged from Scandinavian countries, especially Sweden [10]. Children are encouraged to learn how to control themselves and be aware of their learning and health [11], for example, how they feel in different activities and environments.

This chapter presents a collaboration model project where researchers from the university and staff from independent preschools meet in collaborative forms and work with jointly developed problem formulation and problem sets. Researchers and preschool staff started a project that touches on an area identified in the preschools and intends to benefit all parties involved. By working systematically with documentation in a way that is based on a scientific foundation, the project expects to contribute proven experience that is relevant for both the university and preschool.

The practical research project intends to contribute to practice, research, and education, challenging and enriching each other in an ongoing process where professional development can contribute to the field of knowledge.

In the long term, knowledge about this expects to balance the mental and physical health of the children and give them possibilities to learn more about their health. In a collaboration between preschool staff and researchers, this practical project wishes to establish an exchange of experience and knowledge between the participants, focusing on how pulse-raising activities and rest can contribute to preschool children's recovery in the preschool environment.

The project intends to contribute knowledge about how different activities can offer a balance between rest and more pulse-raising activities. The physical artefacts included in various activities consist of the material provided to the children through learning and play materials. Digital tools are also included as part of these artefacts alongside the learning environment—outside and inside—which contributes to children's learning and development. Agenda 2030 [12] highlights in goal 4, "Good education for all", that all education systems all over the world need to meet people's needs throughout their lives—from preschool, primary school and up in the school system, as well as equal opportunities for all individuals for lifelong learning that favours participation in work as well as in society. Children are in preschool for a period of their upbringing, and their development is influenced by what happens there. The preschool must ensure children's learning and teaching experiences promote health and well-being. The preschool is also responsible for identifying, preventing, and removing obstacles in children's learning and development activities. A recurring development area with health promotion work is that it must be linked more clearly to teaching [11]. Learning can develop when the children are engaged in their learning process about their well-being [13].

Aim:

How can the theory of practice architecture be used to understand preschool staff and children's experiences of activities that provide well-being, and what promotes alternatives hinder the process?

2. Swedish preschools

The ECEC institutions in Sweden are educational settings that aim to give education and care to children in their early years. The ECEC institution is divided into preschools for children aged 1-5 years and preschool classes for 6-year-olds before formal schooling starts at seven. All Swedish children from 1 year have the right

to be educated and cared for in ECEC institutions. The School Act (2010:800) [11] establishes that education within the school system, which includes preschool, aims to promote the development of all children and a lifelong desire to learn. According to statistics [14] in 2022, there were 508.815 children in Swedish preschools, 115.309 were 4 years old, and 116.092 were 5. From the age of one, children must be offered preschool to the extent necessary concerning the parents' gainful employment or studies or if the child has their own needs due to the family's situation in general. The municipalities must also offer preschool to all children for at least 525 free hours per year from and with the autumn term in the year the child turns three (general preschool). The home municipality is responsible for ensuring that preschool education is provided for all children in the municipality who must be offered preschool and whose guardian wishes it. Individuals may, after application, be approved as the principal of a preschool. Preschools with an individual principal can be operated as, for example, a parent cooperative or staff cooperative by a foundation or a limited company. The municipalities ensure the business meets good quality and security requirements. Most Swedish preschools run by a municipal principal make up 70% of the preschools, and those with an individual principal, as in this study, amount to 30% of the Swedish preschools. The groups of 4-years to 5-year children consist of 16 children in preschools driven by municipalities. In independent preschools, the groups are slightly smaller [14]. The Swedish preschool has a national curriculum [11], which should reflect the values and rights expressed in the UN Convention on the Rights of the Child (CRC) [15]. It is fundamental that all children must be involved in the activities and that they are planned and carried out to promote their development, health, and well-being [11, 16]. There are conditions for well-being in preschools where all children can interact with other children and staff. Responsive staff who create a positive learning environment and take the children's opinions into the teaching are essential for the children's involvement in the actual preschool activities. It provides a sense of social belonging to cope with things and be independent, which is necessary for well-being [17]. Play should play a vital role in education, and an approach by the work team and an environment that encourages play confirm the importance of space for children's development, learning, and well-being. Listening to the children's voices is a part of everyday activity, and in Sweden, children are encouraged to express their thoughts about the experiences provided by the adults [11].

3. Well-being

Children's rest, recovery, and well-being are essential, and all decisions must be based on what is considered best for the individual child [18]. The preschool curriculum [11] emphasises that the preschool must offer a good environment and a well-balanced daily rhythm adapted to children's needs, meaning that activities are part of the learning environment. It states, "Preschool education should be planned and implemented to promote the children's development, health, and well-being" (p. 7). Preschool children can have extended stays at preschool and leisure activities during their free time, which can cause stress that can manifest itself in different ways, and their experiences of tension and relaxation can be very individual [19]. Therefore, preschool staff needs to construct places where pressure is reduced and become aware of how they can contribute to feeling better [20]. According to the preschool curriculum [11], "the children must be given the conditions to develop versatile movement skills by being allowed to participate in physical activities and stay in different natural

environments. The education should enable the children to experience the joy of movement and develop their interest in being physically active (p. 9). Evidence-based interventions in the preschool learning environment to increase physical activity to improve children's health can be found through previous research [21]. There is room for research that touches on the balance between physical activity and rest and the children's recovery.

4. School improvement

School improvement research examines how society mandates reforms can be implemented in schools' pedagogical work, where the basic idea is to control this through improvement efforts [22]. Hopkins [23] defines school improvement as a distinct approach to create educational change that enhances student outcomes and strengthens the school's capacity for managing change. Harris [24] argues that successful school improvement depends on the school's ability to manage change and development and should be a process. In professional, collegial learning communities, teachers and other school staff work to accomplish a unified understanding of their professional mission by identifying fundamental knowledge, skills, motivation, values, and attitudes necessary for the work [25].

Researchers have described school improvement processes in phases such as initiation, implementation, institutionalisation, and diffusion [26–29]; initiation means a new idea is presented in an organisation, for example a school. This idea must then be implemented in practice, which involves anchoring ideas, activities or structures in the individuals who will create change [30]. Institutionalisation is a process where the organisation has made an idea known that is fully established in the organisation. After this phase, experiences can be spread to other schools [31]. Previous studies show that school improvement can be challenging to implement and that a commitment of teachers is needed in school improvement processes [32, 33].

The improvement work in this study is regarded as a planned change process which, according to Jacobsson [31], needs to have well-developed strategies for improvement, while emerging approaches where school actors adopt an implementation to their own local needs are of decisive importance to achieve results planned changes can be considered conscious and goal-oriented actions where the organisation's members go through different phases to achieve a change [34]. The planned change has a normative element because there is a desired state as an endpoint or goal [35]. In professional, collegial learning communities, teachers and other school staff work to accomplish a unified understanding of their professional mission by identifying fundamental knowledge, skills, motivation, values, and attitudes necessary for the work [25]. Planned changes can be considered conscious and goal-oriented human actions where the organisation's members go through different phases to achieve a difference [34].

5. Action research

According to Koshy [36], action research is seen as a practical approach to gaining a better understanding and improving practice and also to increase the empowerment of the teachers. An action research process includes self-reflective cycles of questioning, gathering data, reflection and deciding the course of action [37]. The approaches

are action-oriented and enable participants to learn from their experience, change directions and priorities for their research, and introduce corrections repeatedly throughout the project. Action research is based on a democratic methodology in which the researcher, together with, for example, children in preschool and their teachers, develops knowledge about a specific area and applies this new knowledge practically [38]. The action research approach supports scientifically based professional development following the Swedish Education Act [39] and has its starting point in proven experience and a scientific basis. Warren et al. [40] means that teachers' beliefs, professional identities, and levels of expertise change through action research can be strengthened and changed by an action research approach.

6. Practice architecture

This study used a practice-theoretical theory to investigate what happens in the change process. Mahon et al. [41] argues that everyone participates in different practices daily without reflecting on them. According to Mahon et al., it could be practices like teaching, painting, or cooking. Practice can be described in varying ways depending on which theoretical perspective it is based on, and according to Schatzki et al. [42], an internship exists in a specific context (site), such as a school activity. This means practice is bound to a space and must be studied in its context. Schatzki [43] points out that practices can change and contain different activities related to time and space. For example, the change preschools face in terms of knowledge about children's well-being in the daily activities in preschool. The perspective of practice is thus understood as something that consists of the activities of individuals, and that includes what is: (1) said (statements, thoughts), (2) done (actions and actions in various forms), (3) relates (different ways in which individuals relate to each other) and, in summary, a practice is made up of the speaking, doing and relating that exists in a common goal or project [41]. The three arrangements expressed by Mahon et al. [44] involve each other and form architectures of practice that can both limit and enable practice. In this study, cultural-discursive arrangements influence what is said and thought (sayings), for example, language and the discourses, i.e., the communication and reasoning used within a practice. These arrangements can influence by hindering or promoting what is possible to say and discuss in a specific context and place at a particular time. It can also be considered resources available to practice. Examples include the language spoken and discourses in national documents. The material-economic possibilities affect what is possible to carry out (doings) in a physical dimension. A school with limited access to training pedagogues can limit the opportunities to teach a subject qualitatively. The resources can enable or restrict what can happen in practice via actions by influencing what, when, how and by whom something can be implemented [45]. The social-political arrangements affect how individuals relate to each other (relating). For example, politicians influence teachers' actions by deciding on governing documents for the school. Likewise, hierarchies and power can affect an organisation. Examples include autonomous teachers, formal leaders and how a school's infrastructure affects opportunities for collaboration and exchange of experience [45]. Schatzki [43] emphasises that all social life is part of the practice and, according to the researcher, social reality includes a network of practices that are not isolated from other practices. A practice is affected by other practices and affects other practices, something that Kemmis et al. [46] term ecologies of practices indicate. Among the central concepts in practice architecture, the project is also

essential in the theoretical framework. A project in a practice is the intention that the participants try to achieve, the purpose of the practice. What is said/done/related is connected to specific projects and constitutes the purpose of the practice according to the theory of practice architecture [46]. Practice is defined by saying, doing, and relating in a specific context and in a particular place and can be told to answer the question What is happening here? [38, 46]. In summary, practice architecture is the conditions and prerequisites that enable and limit what happens in practice. According to Mahon et al. [44] a practice-theoretical starting point is appropriate when it comes to understanding and developing a practice.

7. Method, material, and analysis

7.1 Action research approach in this study

An action research process includes self-reflective cycles of questioning, gathering data, reflection and deciding the course of action [37]. The approaches are action-oriented to learn from experience and enable participants to learn from their experience, change directions and priorities for their research and introduce corrections repeatedly throughout the project [38]. A distinction from more traditional research is that action research is when researchers work with the researched to break down the differences between them, which is the approach for this study. In this study, the participants focused on activities in the initial cycles of our action research project, specifically the gathering of teacher's and children's experiences of well-being. The research in the study followed a typical action research process, including planning, action, observation, and reflection [47]. The identified target leading to action was viewed from perspectives, and group discussions were conducted involving the participants in the study. Warren et al. [40] state that teachers' beliefs, professional identities, and levels of expertise change through action research can be strengthened and changed by an action research approach. The identified target leading to action was viewed from diverse perspectives, and group discussions were conducted involving the participants in the study. Warren et al. [40] state that teachers' beliefs, professional identities, and levels of expertise change through action research can be strengthened and changed and that systematic reflection can improve their pedagogical content knowledge.

7.2 Background and sample

The overall study is a 3-year study with an action research approach named "The possibility of learning environments to offer long-term recovery of rest and pulse-raising activity". It was initiated by four principals who lead one preschool each, and they all base the needs of their organisation on agreement with the preschool teachers. The project started in January 2022 and will end in December 2024. The study's target group consists of four Swedish preschools where staff, principals, and children aged 4–5 were the informants. All pedagogical staff in this study are named preschool teachers, even if the presentation of each preschool shows that some are childminders. A preschool teacher from each of the four preschools was recruited as a co-researcher/process leader; in the text, they are called middle leaders [48]. They arranged actions with the other staff and the researcher and supervised their colleagues. Five children from each preschool, aged 4–5 years, participated as informants

in the study. The preschools have de-identified names in the text and have been given fictitious names. The Fir Tree Preschool is a staff cooperative; the Oak Preschool is a non-profit association; The Cherry Tree Preschool and The Pear Tree Preschool are parent cooperatives.

7.3 Data collection and analysis

The empirical material comprises six process meetings between the researcher and the middle leader and two dialogical meetings between the researcher and principals from November 2022 to May 2023. Field notes and photos documented 10 observations. The staff interviewed the children during spring 2023, used cameras, and attempted to notice speech, body language and facial expressions during the actions by field notes. After moments of data collection, analysis was done together with the researcher and discussions of forthcoming action. The four middle leaders regularly discussed with the researcher to reflect on the action and process. The research has been carried out and analysed based on the three arrangements that practice architecture consists of and which are simultaneously in practice, according to Schatzki [43]. What is said, done, and related overlap, according to Kemmis et al. [46]. However, the analysis has refined these arrangements to create an understanding of the data material. Transcription, reading and re-reading the material and noting initial ideas was the first step. This process became important to be familiar with the data. After that, the collected data has undergone a content analysis [49]. By working with a highlighter, expressions in the text were marked with yellow, actions with green, and relations with pink, and then sorted based on which arrangement they fit into. Afterwards, statements were entered into a worktable where cultural-discursive, material-economic and socio-political arrangements constituted units of analysis. This moment included reviewing codes during the process; Initial codes were created and then added to themes. The culturally discursive arrangements that emerge in the analysis by sayings were phenomena and knowledge. The material-economic arrangements realised through activity and work were time, participation and structure. Finally, the socio-political arrangements that emerged in the analysis were a common goal and relations. The study complies with ethical requirements in Swedish research and has undergone an ethics review.

8. Results

8.1 General narrative for the project with four preschools

In a 3-year action research project involving preschool teachers, children, principals and one researcher, we wanted to deepen our understanding of the phenomena of well-being and what enables and limits recovery practices. We sought knowledge about how practices that promote children's recovery can be understood and developed. This chapter presents previous results after the project's 7 months of action research. The children's participation in the process was a starting point. The action research project was divided into several phases, and we used different ways to collect data. Dialogic conversations between middle leaders and researchers were conducted once a month. Dialogical discussions between researchers and principals were done twice during the period. Documents and observations formed the basis for increased understanding and possible changes and interactions between the development

work and research. In the action research project, preschool teachers and principals focused on researching and developing recovery practices to improve their professionalism and knowledge. The first phase began with all preschool staff participating in a meeting, receiving some training in action research from university teachers and discussing previous action research projects. The perceptions of recovery practices at the preschool, both rest and pulse-raising activities, were inventoried as a first survey. The results were presented to the participators after the meeting, and then they collected the children's opinions at each preschool about how they experienced recovery—both rest and pulse at their preschool with a focus on activities and learning environments. The result from teachers and children were shown in mind maps on the valet in the preschools.

This chapter gives an insight into the process and offers preliminary results from the project. All preschools have struggled with the implementation of the project, it took time to read and learn how to do action research in their units, and the processes take time. All preschool middle leaders mean that the time is necessary to involve all staff and get ready to research and work systematically.

8.2 A narrative from the Fir Tree Preschool

Five preschool teachers, one cook and a principal work at this preschool. The preschool's theme is health, movement and outdoor activities and focuses on health. The preschool offers the children many outdoor and varied activities during the day. The meals are done by an employed cook who prepares the food from high-quality eatables, and the preschool wants to offer healthy meals. The preschool staff discussed the idea of recovery through rest and pulse, and the children became familiar with the concept and its meaning. They have told the team their experiencing recovery. The children and staff explored what is perceived as recovery. These thoughts formed the basis for mind maps that the staff produced and presented visibly on the preschool's walls. Also, the staff have noticed their ideas about what recovery can be in a mind map. They analysed that the team considers recovery too narrowly and needs to expand their perception of what it can be. They are convinced that the children's participation in the action research project can expand the view of what recovery is. In the opinion of recovery, it appears that stress can counteract recovery. Both children and staff mentioned rest as an activity after eating lunch. This topic was something the team wanted to improve and learn more about children's experiences.

The preschool's first action meant they wanted to investigate the possible recovery the children experienced during the rest after the meal. The children offer four different breaks: choice (1) sleeping outside in a pram, choice (2) sleeping inside on a mattress (often time-bound), choice (3) listening to a book in a small group (three children) with a staff member who reads in a separate room, choice 4) getting a massage as recovery. In the morning, the children can request the type of rest they want after lunch, and usually, they get their wish, but sometimes some rest cannot be carried out due to the logistics." *We are not able to do this every day, all staff must take their breaks*"(Middle leader, 1). Likewise, it can be challenging to carry out planned activities when there are substitutes.

When the children talk about their experiences of the rest and try to express different feelings, some share that they enjoy being in the small group of three children who get a book read by an educator, alternative 3. Two children mentioned feeling relaxed and calm in this activity because no "toddlers" were disturbed and loud. The educator read calmly and clearly, allowing all three to comment and ask questions

about the content. "*It will be calm and nice when she reads a story to us, and we can see all the pictures when there are not many of us*" (Child 1).

Regarding massage recovery, choice number four, most children liked it, but two children did not want a massage at all and wanted to choose other rest alternatives. One child expressed that she likes having someone massage her neck, but not on different places of the body (Child, 4).

One of the rests, choice nr two, means the children listen to sound recordings and lie on the floor or a sofa. During an observation, eight children rest that way, and it is a rest that several children seem to appreciate. Comments from children after the activity gave the impression that the children entered a rest phase with recovery, which all children except one child confirmed.

This child only wanted to sleep and rest at home—during the day at preschool, the child wanted to be active and play, and rest was not his cup of tea. *Sleeping at preschool does not feel so good; I'm too big for that and do not want to rest either. It's boring* (Child, 5). This child only wanted the time to pass so it could be possible to play with a friend in the preschool.

Action two at this preschool means we try the rhythm as a starting point for discussing recovery via heart rate and rest. Twelve children gather on a round carpet where the preschool teacher informs them about what will happen. Recovery as a phenomenon and concept is addressed, and the preschool teacher asks the children to try to feel what happens in the body during the rhythm session. A digital program is conducted where the children, as a first step, conduct pulse-raising activities to music and are then asked questions about how it feels in the body. Answers such as "The heart is beating very fast" (Child, 2),; "The pulse feels like fire", (Child, 3) and "The pulse beats faster than before we started".(Child, 5) The level of activity in the movement is increased, and the children can then tell how it feels, and they can tell that the heart is now beating even faster than after the first activity. "The heart is pounding even more now" (Child, 3), a concluding part of the rhythm, means a winding down and meditation where the children can sit, close their eyes, and unwind. They express the difference between the heart-rate-raising activities and the closing part. Observations of the activity show that the children looked relaxed and calm during the last session, and the children also confirmed this later on by talking about the feelings in their bodies. A preschool teacher points out that both actions can be affected by staff being absent due to illness or leave.

Difficulties in carrying out activities are mainly mentioned because staff have the right to rest, and getting the logistics to work can sometimes be challenging. Likewise, it cannot be easy to carry out planned activities when there are substitutes. It also appears that some children do not wish to rest in any way but want to play instead. Observation shows that the children know the body's reactions during pulse-raising activities. Several of them express that they enjoy the final part of the action, where they wind down and close their eyes.

8.3 A narrative from the Oak Tree Preschool

The Oak Preschool is a unit of 20 children and five staff: three preschool teachers, one Montessori-educated leisure educator, and one medical resource for children with medical needs, in addition to the principal leading the preschool and the school included in the unit. Preschool Oak is a private and non-profit association where the board heads the school. The orientation is Montessori pedagogy, and the operating idea is that everyone should feel good and develop sustainable self-leadership. This

preschool first wanted to explore if and how their collective morning meeting with the children could be improved and give them learning moments instead of waiting for the activity to start.

The first action in this preschool is to explore how the morning meeting activity could be improved. Over time, the preschool teachers observed and noted that transitioning from a move that would include going to the toilet and washing hands created anxiety as the children gradually gathered for the meeting. There was a waiting time before the activity morning meeting could start, and the staff wanted to change this to avoid stress for the children. The waiting time could mean chaos, high noise levels and children sitting and waiting for the meeting. It could also mean that an adult read a book to a child and that other children flipped through books, but the educators saw it as an opportunity that needed to be improved and changed. They decided to have a "warm-up time" before the meeting. The name was created by the middle leader that drew comparisons to sports. "Before we start with the traditional morning meeting, we must warm up!" (Middle leader, 2). The activity represents the time and activities when the children came from washing hands and visiting toilets, one by one, and participating in the warm-up. The movement was observed, and the children were getting into the action smoothly. Two preschool teachers were present in addition to the one leading the activity and one of them took field notes. The training aims to contain pulse-raising activities with movements and rest to contribute to the recovery. The staff tried this activity by removing perceived stressful moments for the children and replacing them with a warm-up exercise.

After action one, a reflective conversation was held between staff and researchers, where the action was evaluated. The preschool teachers decided to try this type of action about once a week, and all the preschool staff should be holding the warm-up and the morning meeting before a new evaluation. It was decided that each preschool teacher should be allowed to put their imprint on the activity; "We *"must be given the freedom to carry out the activity based on our planning and what we want to do during the activity." (Teacher, 4).* During the evaluation, the staff expressed that time to analyse and talk to the researcher and each other was necessary and valuable.

The following action, which was action number two, a new warm-up and morning meeting, was observed and documented by one preschool teacher. Three educators were present, and one was responsible for planning and implementing the warm-up time arrangement. Another preschool teacher took field notes. The observation notes, including the researcher and staff, were analysed during reflective conversations. The analysis could distinguish essential parts: (1) The meeting needs to contain movement, including pulse raising and rest. (2) To maintain attention, the preschool teacher must give the warm-up within a limited interval. (3) The meeting leader must be responsive to the group's daily form and flexible to change structure and content if required. (4) Other participating educators must not remove their focus from the group because the observer noticed that the children were disturbed if the adults spoke to each other, even if they whispered. It became clear that the meeting needed structure from start to end. Participants at the reflection meeting decided they must dare to review each other and give constructive criticism to achieve a collegial development that can promote the project's goal." *We must dare to talk to each other and ask questions when we see that something is not going as we thought and how the preschool teacher can change his actions for the children's good!"* (Teacher, 6) The preschool teachers also argue that they need to cooperate in the meeting and that the leader should not feel that somebody else should take over the meeting if we notice that we have to act to complete the leader to help depending on the situation with the children. *"We*

know that everything can happen in the child group, and we must help each other and don't see it as criticism. We must work with constructive criticism!" (Teacher, 7).

Action number three was a morning meeting observed by a preschool teacher and documented by digital observation. The preschool teachers analysed the film and noticed that after only three morning sessions with warm-up activities, the children connected to the action as they finished after going to the toilet. The educators draw attention to the fact that there is less stress and a calmer environment than before. The team decided that the following action would mean that the educators have a similar arrangement and refrain from it having to be arranged based on their interests and instead focus on what the children feel good about and safe with.

The reflections from the participants at Oak Tree Preschool point out that the warm-up activity must have structure, both in time and content. They also discussed the possibility of working more collegially and collaboratively to improve their work in an environment that can create well-being.

8.4 A narrative from the Cherry Tree Preschool

The Cherry Tree preschool has twenty-two children and consists of a parent cooperative with staff and guardians on the board. Three preschool teachers, two childminders, one cook and a principal work here. The preschool's theme is the learning environment, which should stimulate discovery and learning with other children and adults. Outdoor activities with different physical movements are in focus. The staff and children felt it became messy and stressful when they came in before lunch, took off their clothes and washed their hands close to lunch. The time before all the children were ready for lunch meant that children had to wait if they wanted help, and it often got loud as the children did not know how to behave. Therefore, the staff wanted to change and improve the situation for the children when they would go in after being outdoors to create a calm environment and minimise stress for the children. They wanted this temporal gap to become an educational situation where the children would have the opportunity to gain experience and rest before lunch. The preschool teachers started thinking about which children (ages) should go in first, what the environment would look like, what to meet the children when they came in, and what activities they could do. During a planning day, possibilities were discussed for developing this element to become less stressful for the children and become educational, not just an interval between two activities." *We were all stressed over the situation, even the staff. Still, the activity going inside, have been done in that way since I started to work here" (Preschool teacher nr 8).*

Action number one in this preschool consists of improvement when children come in for lunch. Before the action, the preschool teachers talked to the children about how they experienced the time before lunch and what they thought could improve the waiting time. Half of the children thought it was a little bit noisy, and half of the children meant that it was good enough. They suggested, "If we think it is noisy, we can be quiet or ask our friend to be quiet." (Child, 10). "We can wait outside on the bench so the smaller children can go in first, and we can read a book until everyone is ready for lunch" (Child, 8). (There is a bench near the door under the roof, with books available.)

The preschool teachers have divided up and entered in rounds, and they divide up once we enter; there are different sofas for the children to sit on and look at a book, and the educator who enters with the children is responsible for taking his group to "its place". The younger children have a play box with, for example, Duplo, books, toys, and different building materials, which are taken out when everyone has had a

new diaper. This creates a quiet moment before the meal, even though the children are both hungry and tired. There are tables to train fine motor skills in the hall for the younger ones. There is a TV monitor in the lobby where the children can look at slide shows before the food while they wait. There are books—and the preschool only has a small number of books available to create a community to look at together. The preschool teachers have placed a sofa in one of the rooms where the children who enter as a group sit together.

After the first action, the preschool teachers evaluated the activity and talked with the children. They noticed the action improved the situation before lunch; it was calmer and not so noisy, but they wanted to do more. In connection to the hall, there became a stressful situation when the children were going to visit the toilet before lunch. The doors to the bathroom were sometimes open, and the children felt that they did not have privacy, and it was noisy and messy. Sometimes, other children knocked on the door while others visited the toilet.

Action number two. The preschool teachers created footprints outside the toilets to facilitate queuing, reduce jostling, and create calm. They put numbers 1–10 at the large toilet to signal the children where to stand and wait before entering the bathroom. The children did receive any information on how to use these markings. They reflected on the new things and discussed and explained what they thought the footprints were and how to use them. The preschool teachers notice that the prints have worked very well, and without explaining to the children what the idea was, "You saw how the children took to the new thing and explained to each other what they thought the footprints were and how to use them" (Middle leader, 3).

During reflection after these actions, the preschool teachers noticed that the children could give their opinion and that the thoughts from them and the staff was similar in many ways. They decided to continue with the activities before lunch and keep the numbers outside the toilet to evaluate this further with the children. They wanted to go on with action number three: create calm after lunch. They have moved the children's after-lunch rest so that the group stays in each room to reduce jostling and give them a more peaceful environment. After lunch, every child goes to the toilet, and then the preschool teachers arrange them in their age group for after-lunch sleep. This moment often becomes messy and loud, and they continue to work on finding effective strategies to calm down together with the children. The action consists of an activity with three preschool teachers participating in the lobby to help with toilet visiting and support those children waiting to rest. The toddlers sleep in prams, and one staff arranges that. Another preschool teacher takes care of the 2–3-year-olds in one room and sets their rest on the floor. The third preschool teacher participates with the 4–5-year-old children, and they usually look at books, rest on the floor with music or whisper to each other.

After these actions, the preschool teachers notice that there must be one preschool teacher for each group; it becomes disturbing and stressful when they depart. They discussed the following action around the after-lunch rest and decided to try if it could be more smoothie if the children's rest accessories, such as stuffed animals and pillows, could be placed in the room where they should rest. At the time, all these things were in the lobby on the children's storage shelf.

8.5 A narrative from the Pear Tree Preschool

This preschool has 18 children and is a parent cooperative, with five children participating as informants. The preschool runs as a non-profit association with two preschool teachers, three childminders and a principal working at the preschool. The

preschool has movement and outdoor activities, a health-promoting approach as a profile. Before the first action, they talked with the children about what rest was, both pulse rate activities and activities for rest and all the children were familiar with the words and what they represent. The preschool teachers started to observe the children and what they chose to do (play) outside, the activities each child was occupied with. They talked about what they saw, what each of the children was playing outside, heart rate-raising and recuperative. "*We observe when we are out with the children and make notes by digital or handwritten field notes and take photos. We want to establish a routine so that the observations can take place in everyday life Teacher, 12)*. The middle leader reflects on the observations done so far; *The decision to observe was taken together, but absence or forgetfulness in the daily work affects the numbers of observations*" (Middle leader, 4) During the time when they intend to collect data they had some sickness in the staff group. The Middle leader meant that it affected the process, but they had observations with field notes and photos as a starting point for discussion and analysis. During this first observation, they could conclude that children (12) play pulse-raising and restorative games outside. Children (13) play wholesome, calm games outside and inside—children (14) play both recovery and pulse-raising activities. We have a child (15) who finds it easy to get active with pulse-raising activities but hard to find restorative exercises outside. The following action will involve discussing the children's mind map with the group of children. After that, in the third action, the children individually will take photos of the environment or activities they often do and like. They are going to use digital cameras. The middle leader (4) says that we think that Photo Voice is an excellent method to discover their perception of activities as pulsating or restful. It will be interesting to have more input from the children!"(Teacher 15).

The actions that have been done at this preschool have a strong touch of the child's participation in the project, and they focus on getting the children's opinions in from the start by using photo voice and discussing with them. It also shows that it could be challenging to create a base to do research on the daily.

9. Narrative from a practical architecture viewpoint

The intention of the project, to create knowledge about activities that make recovery, means that all preschools have the same goal but that the needs and, thus, the content of the actions in the study differ between the units. The dialogical meetings with the middle leader and researcher showed a desire for intersubjectivity to create knowledge about their development processes, understand others, and contribute with an increased understanding of the phenomenon within the group.

9.1 The semantic space; realised through language

The culturally discursive arrangements that emerge in the analysis are perceptions of *phenomena* and *knowledge*. The preschool teachers believe that the concepts and words to be used in the study should be the same for the adults and the children included in the study the concept of recovery, heart rate increase and rest. These concepts have been discussed among preschool teachers. It has also been clarified for the children who, according to statements and observations, show that they understand the meaning of the phenomena. Investigating how the children perceive activities concerning these concepts will be explored in detail during the project's process.

This may mean that the educators can offer what the Swedish National Agency for Education [11] mandates, to offer the children varied activities that can contribute to health and well-being. All participating preschool teachers express an interest and a willingness to participate and implement the project's intentions. However, there is uncertainty about action research and its role in the research process. "*We do as it says in the action research manual and according to the teaching we have received, but it is difficult sometimes. We are not so sure about it. But it is fascinating, and we think we are doing it right!*" (Teacher, 6). In the collective conversations conducted with researchers, it became clear that the participants put words to the experience and brought it together with the knowledge they had gained about action research. They believed that although it was difficult, it provided professional development opportunities. The preschool staff discussed the difficulties of daring to give each other constructive criticism, which can hinder the process. All four middle leaders stated that they used a lot of time to implement the concepts in their preschool and allowed both children and adults to reflect on how recovery can be perceived. Statements show that the preschool staff developed a common view of linguistic understanding of well-being. This intersubjective communication created through what is thought and said can contribute to the team developing a common pedagogical language and thus have the same frame of reference for how concepts should be understood [50]. Having a common language can be interpreted as the employees being socialised into a common practice [51]. The result also shows that the preschool children had an opinion of how recovery environments could be shaped and that it is important to listen to their voices [11].

9.2 The physical space and time: realised through activity

The material-economic arrangements identified were *time, participation and structure.* To have time to do this project with quality was something that all four preschools discussed, and they compared how the conditions were at the four preschools. They are all small units. "When someone in the staff is sick or absent for another reason, it can be difficult to find a replacement, and even if we get a substitute, it is difficult to run the project because it requires knowledge and to be involved in our process" (preschool teacher nr 2). Another of the preschools can have staff that works during days and weeks when there is a need to replace some teacher who is out of work for some reason. "Our preschool has an experienced retired substitute who can come and work when we have an illness or absent staff. We have had the opportunity to involve her in the work with the action research, which is very positive. (Middle leader, 1) The preschool teachers mentioned that knowledge is required to participate in a project like this, but they point out that all staff participate and that they have interested principals. Material-economic arrangements made it possible for all staff to join at the start of the project to share experiences and expectations of the project and take part in an introduction to action research that the researcher arranged. The preschool staff had varying conditions regarding time and opportunities to analyse and plan new steps.

In contrast, the actual action research procedure took different lengths of time for the preschools to start up. The activities presented to the preschool children can be seen as didactic choices (actions) where the staff tries to achieve the curriculum's requirements regarding offering good care with a balance between activity and rest [11]. The experience from one preschool to giving more structured warm-up exercises to create calm was also a knowledge that was important for them.

9.3 The social space realised through power and meetings

The identified socio-political arrangement was a *common goal* and *relations*. All staff at the four preschools participated in a joint meeting for about 4 h, where they were given an introduction to action research by the researcher and had the opportunity to share their experiences and discuss the upcoming project work. On this occasion, the participants worked in cross-groups and defined and discussed what feedback in the form of pulse-raising activities and rest for the children was for them. After this activity, they expressed how valuable it was to discuss the project, present their preschool to other professionals, and participate in how they wanted to go further with the action research activities. The following quote expresses several participants at the meeting: "It was very inspiring to discuss how we perceive recovery and how others carry out pieces of training. We were divided into groups, enabling us to participate in the other preschools' planned arrangements. It became clear that we have premises and activities that differ, but it is also a strength that we are small preschools and work towards the same vision. We wish for more occasions when we can meet "(preschool teacher 5). The municipal schools have networks that the municipality arranges. We want to create something similar with the staff of these preschools who are here today. The preschool teachers have a relational focus by attending to the children's opinions and experiences. How children should be treated in the preschool is described in the curriculum's goals, which means that the staff in the preschool must show care for each child and create positive relationships between child and adult and between children. The team must also attend to the children's opinions, which is done in the action research project where children's experiences and experiences of recovery in preschool are considered. The national framework in the form of the curriculum's intentions was essential for developing the project. These studies assess the curriculum as a social-political arrangement that affects the relational aspects of preschools.

10. Discussion

With the support of practice architecture [46], arrangements have been made visible to understand preschool staff and children's experiences of activities that provide well-being in preschool. It also shows what promotes or hinders the work towards creating learning environments and activities that contribute to children's inner sense of well-being. The project is in an initial phase, but the narrative points to common and different experiences from staff and children from the four preschool units. The practice is shaped by the cultural-discursive, material-economic, and social-political arrangements that frame the practice and constrain or enable how it is shaped. By illuminating the semantic space, it was identified that knowledge was essential and that the concepts used in the actions should be perceived similarly to create a common platform for children and adults. Regarding the physical space, time for improvement work and participation with reflection were identified as necessary for the processes, and previous results support this [25, 31]. One preschool team concluded that structure was influential in implementing activities, a design based more on the children's needs than on the pedagogues being allowed to implement activities based on their interests, a goal in the Swedish preschool curriculum [11].

The study shows that preschool children could give valuable insights about their opinion of their inner well being, which confirms earlier studies [8]. All four

preschools worked in line with the curriculum [11], and involved the children in the project and listened to them, and their voices and perceptions provided insight into their experiences of what recovery might be. It follows challenges for the preschool to make use of the children's views to create recovery for all children, for example, considering that rest can also be stressful. The middle leaders discussed in a common meeting that children's participation in the project can strengthen their social value, as Wigfield et al. [17] point out. The children's opportunities to participate in a project like this make visible a meeting between staff and students that is framed by the social space according to the practice architecture. The pedagogues in the study experienced action research as a possible way to gain knowledge about a phenomenon and contribute to collegial discussions. They also stated that documenting and observing is something they do, but doing it systematically and taking a research approach was difficult. Finally, relations between the actors in four preschool, and a common goal were identified as appreciative and developing in the actions carried out and analysed regarding the social space. There were limitations in this study that have to be mentioned. It is a small study with few participants, and it is not possible for generalising. The study's analysis tools are the three arrangements that practice architecture consists of in order to refine the analysis. They are tools and are limited even if they enable a way of understanding the practice and the experiences around a phenomenon. At the same time, the three arrangements can provide an understanding of the action research project that is carried out at the four preschools and contribute to continued development work.

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Chapter 5

Predictors of Early Childhood Developmental Outcomes: The Importance of Quality Early Childhood Development and Education (ECDE) Services

Patricia Kitsao-Wekulo, Maurice Mutisya, Njora Hungi and Moses Waithanji Ngware

Abstract

Few studies have established the influence of different aspects of early childhood development and education (ECDE) quality on children's outcomes in low-resourced settings in sub-Saharan Africa. We examined the impact of different aspects of ECDE quality on school readiness in a low-income context. The current study is a cross-sectional sub-study of the *Tayari* preschool pilot program evaluation. Baseline data were collected from public ECDE centers. Multiple linear regression analysis was used to establish predictors of school readiness, that is, 4-6-year-old children being mentally, physically, socially and emotionally ready to start and succeed in primary school. Teaching experience, availability of textbooks and school facilities were significant predictors; learners' school readiness scores decreased with each additional year of teachers' experience, and were higher where school facilities were better, and in schools where textbooks were available. On the other hand, school enrolment, classroom resources, head teacher support, educational attainment and teacher training did not predict school readiness. Promoting quality preschool programs has important implications for policy as it can lead to improved school readiness and later success for children in disadvantaged settings.

Keywords: early childhood development and education, low-income, predictors, school readiness, *Tayari*

1. Introduction

The importance of improving the quality of early childhood development and education (ECDE) services has received increasing recognition in recent years, given that more women with young children are joining the workforce and the demand for childcare provision has risen [1–3]. Research has clearly demonstrated that the

quality of care and education provided to young children matters for school readiness [4], particularly in poor and disadvantaged settings [5]. High-quality ECDE services promote optimal child outcomes in all domains of development [6, 7]. On the other hand, low-quality ECDE services are associated with negative outcomes for children [8]. There are currently several definitions of preschool quality, depending on what elements are considered. The most commonly referred to elements include structural quality, process quality and educational beliefs of preschool teachers [9–11]. For the purpose of the current study, preschool quality is defined in terms of structural quality. Structural elements of quality which focus on the characteristics of preschools and preschool classes such as preschool and class size (number of children), teacher/caregiver education, qualifications, specialized training and job experience, child-adult ratios and classroom equipment and materials [12]. Teacher qualification is a key characteristic of structural quality as teachers and caregivers are central to providing quality ECDE [13, 14].

It should be noted that aspects of structural quality are often related to process quality [15–17], which is concerned with what happens in an ECDE setting. Bronfenbrenner's ecological systems theory [18, 19] provides a basis for understanding the interconnectedness between process and structural quality. According to this theory, the child's preschool classroom which is one of the social contexts in which the child operates, forms part of his/her microsystem. Within the preschool classroom, structural variables which are one of the spheres of influence on the child may be proximal (for example, classroom size) or distal (for example, economic conditions) [20]. A review of several studies has noted that highly educated and specially trained caregivers teaching in smaller classrooms with smaller child-to-teacher ratios are more likely to organize materials and activities in such a way that the environments are appropriate for children's age [17]. Evidence from various studies suggests that high-quality ECDE programs should therefore have: (a) highly skilled teachers; (b) small class sizes with high teacher-to-child ratios; (c) age-appropriate curricula and stimulation materials in a safe physical setting; (d) a language-rich environment; (e) warm, responsive interactions between staff and children; and, (f) high and consistent levels of child participation [21–26]. ECDE centers with such characteristics enhance young children's cognitive and social development, particularly those from low-income families [27].

In a review of various studies, Manning and others [28] concluded that high teacher qualifications improve learning outcomes regardless of the culture and context. Further, the review established that there was a correlation between teacher qualifications and support for children's development. To illustrate this point, the review highlighted that staff with more formal education and specialized training were likely to supervise and schedule age-appropriate activities; ensure that the room was organized and arranged in a way that enhanced learners' experiences; provide varied social experiences for children; and create a warm and friendly environment for interactions. Similarly, other studies [29–32] have reported that the high-quality pedagogic practices adopted by better qualified teachers create enriched and stimulating learning environments which are linked to better child development and learning outcomes. One of the essential elements of quality early childhood education programs is, therefore, the availability of qualified teachers with the requisite professional knowledge and skills to provide engaging interactions and classroom environments that support children's learning [33]. Such teachers are more likely to use a variety of child-friendly teaching methods for individualized learning and small group teaching, which in turn enhances children's learning outcomes [34]. Whereas

these earlier studies illustrate the strong associations between teacher qualifications and child outcomes, other reviews reported poor correlations between ECDE teacher education levels and children's performance [35]. Such mixed findings suggest the need for further exploration of the relationship between teacher characteristics and child outcomes.

While evidence has shown that highly qualified and professionally prepared teachers promote positive learning outcomes for young children [32], the lack of a supportive environment can hinder them from fostering quality ECDE [36]. ECDE infrastructure plays a critical role in ensuring quality, and a high-quality ECDE learning environment should be characterized by the availability of safe drinking water, appropriate toilet facilities, safe and well-equipped play areas and building structures that provide protection from adverse weather conditions. However, the majority of ECDE centers in many developing countries do not meet these requirements (see [37]), leading to poor outcomes for young children preparing to join primary school.

A developmentally-appropriate curriculum that emphasizes guided learning that is hands-on and language rich is an important determinant of highly effective preschool education [38]. Such a curriculum must be provided in an environment where learners are given opportunities to interact physically with a variety of materials and objects that promote the acquisition of different types of knowledge [39]. In resource-limited settings, the restricted availability of materials may not provide for stimulation in all areas of a child's development. Furthermore, requiring energetic and curious learners to sit down for long periods doing work from their books may leave them bored, frustrated and unmotivated.

According to the Basic Education Act (2013) of Kenya, every child has a right to free and compulsory basic education [40]. Since the turn of the century, there has been a greater demand for childcare services, and the emergence of different forms of service delivery such as home-based, church-based and school-based care [41]. The preschool-based form of care, delivered through public and private schools which may be attached to a primary school, or established on their own, is the most common in Kenya. The provision of early childhood care and education programs was devolved to the counties in 2010, and the Act outlines that county governments are responsible for early childhood care and education programs. This includes the development of the necessary infrastructure of institutions used for conducting preprimary education. Although access to ECDE increased dramatically between 2009 and 2014, national gross and net enrolment rates remain low, at 78.4% and 77.2%, respectively [42]. Moreover, the provision of early childhood education services in Kenya, as in other countries in sub-Saharan Africa [21, 43] remains far from satisfactory, as the majority of public preprimary schools are characterized by inadequate play and learning materials, shortage of trained teachers, poor and irregular pay for teachers, and lack of health and nutrition services.

As far as the literature has revealed, many of the studies that have been conducted on aspects of ECDE quality, such as teacher qualification and teacher training/professional development, have established the influence of these aspects separately, without comparing which of the elements has a greater impact on ECDE quality. Similarly, although there have been studies investigating ECDE quality in sub-Saharan African settings [21, 26, 43], few of these studies have sought to establish the influence of different aspects of ECDE structural quality on children's developmental outcomes. Such limitations of ECDE research make it difficult to determine what works in under-resourced contexts. The study reported in this chapter, therefore, aimed to bridge this knowledge gap by examining the impact of different aspects

of ECDE quality on child developmental outcomes in a low-income context. Such information will be useful for the development of context-specific ECDE policies and practices to improve ECDE quality.

2. Methods

The study reported in this chapter was a sub-study of an evaluation of the *Tayari* preschool program. *Tayari* aimed to develop a cost-effective scalable model of ECDE that ensures children in Kenya are mentally, physically, socially and emotionally ready to start and succeed in primary school. The *Tayari* program sought to strengthen the existing ECDE model in Kenya through the development of child-centered instructional materials, interactive teacher training and ongoing instructional coaching and support, and a child health intervention that integrated psychosocial and health components to support the holistic development of the child. *Tayari* was designed as a randomized controlled trial implemented in public and low-cost private (also known as Alternative Provision of Basic Education and Training) ECDE centers. The components of the intervention were delivered through three treatment arms—treatment one received teacher training support through District Centre for Early Childhood Education (DICECE) officers; treatment two received the teacher training support plus books and teachers' guides; treatment three received all the components for treatment one and two groups, together with a health/hygiene component. The evaluation study aimed to establish the impact of the *Tayari* program by comparing the performance of learners in each of the treatment groups, with that of learners in the control group.

2.1 Study setting

The *Tayari* program was implemented as a pilot project in four counties in Kenya: Laikipia, Nairobi, Siaya and Uasin Gishu. The four counties were purposively selected to represent diverse backgrounds. The geographical spread of the implementation zones was determined according to resource availability. Laikipia County is located at the equator, in the former Rift Valley Province. The main agricultural activities include grain farming, ranching and greenhouse horticulture. Nairobi County is located in the southern part of Kenya and hosts the capital city of Kenya, Nairobi. It is cosmopolitan and mainly urban in settlement. Community, social and professional services account for 52% of all the income generated in Nairobi. Siaya County is located in the Lake Victoria Basin and borders Lake Victoria to the south and west. The county is mainly rural in settlement. The main economic activities are crop and fish farming. Uasin Gishu County, whose capital is Eldoret, is located in the mid-west part of the former Rift Valley Province. The main economic activities are large-scale wheat and maize farming.

2.2 Study design

During sampling for the *Tayari* program, all public preprimary schools across the four counties were listed. Schools were then randomly allocated to treatment and control arms of the study. The evaluation study randomly selected a subset of the preprimary schools in the *Tayari* program. Power calculations were used to determine the number of preprimary schools required for detecting a mean effect size of 0.20 standard deviations at the program level, and assuming a school attrition rate of 5%.

The study reported here was designed as a cross-sectional study. The findings are based on baseline data which were collected from public ECDE centers during two phases of the main study; Phase 1 was completed in January 2016 while Phase 2 was completed in January 2017. The main study used a "stepped-wedge" design where half the sample of schools (Phase 1 schools) was included in January 2016, while the other half (Phase 2 schools) was included in January 2017.

2.3 Participants

In the case where the selected preprimary school had only one preprimary 2 (PP2—the highest class at the preprimary level before learners join primary school) class, 16 learners were selected at random from that class for inclusion into the evaluation study. If the PP2 class had less than 16 learners, all the learners in that class were involved in the evaluation study. For schools with more than one PP2 class, one class was selected at random for inclusion in the evaluation study. PP2 teachers together with the head teachers of the selected learners were also included in the evaluation study.

The study reported here was based on the data of all the PP2 learners (N = 4190) from 303 public ECDE centers that were included in the evaluation study. Those selected were children who were aged between 5 and 6 years and were expected to join primary class one at the beginning of the next schooling year. By the time the data for this study were being collected, the children were just beginning their second year of preprimary school and had been with the same teacher since the previous year (preprimary schools in Kenya have two levels in which the learner is expected to go through—the baby class and the pre-unit class. In most schools, teachers continue with the same children from the time they join the baby class until they move to the pre-unit class). The number of learners in each classroom across the ECDE centers ranged from 2 to 19, with a mean of 13.8 (SD = 3.44). As shown in **Table 1**, boys and girls were nearly equally distributed, with no significant differences across all the counties, $\chi^2 = 6.37$, df = 3, $p = .095$.

2.4 Data collection tools and procedures

Three quantitative instruments were used to collect the data: a head teacher questionnaire, an ECDE teacher questionnaire and a direct assessment administered to the learners. These tools were developed in consultation with the *Tayari* program implementers, that is, RTI International and the Ministry of Education. The head teacher questionnaire was used to collect information about center management, education and training background, enrolment of learners, attendance, class size,

County	Boys	Girls	Total
Laikipia	561 (49.3)	576 (50.7)	1137
Nairobi	369 (51.1)	353 (48.9)	722
Siaya	617 (54.2)	522 (45.8)	1139
Uasin Gishu	595 (49.9)	597 (50.1)	1192
Total	2142	2048	4190

Table 1.
Gender distribution across counties, n (%).

and facilities in the ECDE center. The ECDE teacher questionnaire captured data on education attained, professional training, access to learning materials in the classroom and classroom facilities.

The direct assessment test (DAT) was adapted from the UNICEF/UNESCO school readiness tool (Monitoring Early Learning and Quality Outcomes – MELQO) and early grade literacy and numeracy assessment tools used by other researchers. The adapted DAT, which was in English, was translated into Kiswahili. During the adaptation process, the DAT was reviewed and validated by a panel of ECDE experts which included ECDE practitioners, ECDE curriculum developers from the Kenya Institute of Curriculum Development (KICD), and academicians involved in ECDE research. The DAT was then piloted in 16 preprimary schools outside Nairobi which were not included in the evaluation study. The pilot data were analyzed and the results from this analysis were used to make further improvements. The DAT was used to assess learners' progress in literacy, numeracy, health knowledge and psychosocial skills. All data were captured using tablets.

Field interviewers were taken through a 6-day residential and field training session on data collection procedures. During the residential sessions, they were introduced to the study objectives and trained on conducting interviews, administering direct assessments to children and ethical considerations to be made during fieldwork. A pilot training session in the field provided field interviewers with an opportunity to practice tool administration with teachers and pupils in non-study schools.

During actual data collection, one-on-one interviews with ECDE teachers and head teachers were conducted at a time and place that were convenient for the participants. All interviews took place in a comfortable setting that was free from interruptions. On average, the interviews took about 15 minutes to complete. The responses to the items on the questionnaire were recorded verbatim and were coded before analysis. For instance, the items on educational attainment were coded from 1 to 3, with 1 denoting primary-level education and 3 denoting university education.

The direct assessment tool was administered to learners on a one-to-one basis. Each assessment was completed in about 15 minutes and was preceded by an introductory 1–2-minute interaction between the assessor and the learner to establish rapport. A few practice items were administered before the test items to ensure that the learner understood the test requirements. Responses to the DAT were coded as 0 = incorrect, or 1 = correct.

2.5 Ethical considerations

The study was reviewed by the African population and health research center's (APHRC) internal Scientific Review Committee. Ethics approval was sought and obtained from Amref Health Africa's Ethics and Scientific Review Committee (ESRC). A research permit was provided by the National Commission for Science, Technology, and Innovation (NACOSTI).

Pre-visits were made to sampled ECDE centers to sensitize the county education officials and head teachers about the study, and to seek their permission to visit the schools. Informed consent was obtained before the interviews were conducted. Head teachers provided informed consent on behalf of the learners as many head teachers in Kenyan schools are authorized to do so by parents. Verbal assent was obtained from learners.

All participants were informed that their participation was voluntary, and that they were free to withdraw their participation at any point during the study. Participants were assured that their identities would be kept anonymous and all data would be confidential.

2.6 Data analysis

Data were analyzed at the ECDE center level. Descriptive statistics were used to provide information on school and classroom characteristics, teachers' educational attainment, professional qualifications and years of teaching experience, head teacher support and school readiness scores.

The *Tayari* School Readiness Index (TSRI) was the primary outcome measure. The TSRI was a composite score derived by computing weighted scores from the DAT. First, items in the DAT were grouped into 10 subtasks. Learner percentage scores on each of the 10 subtasks were computed and multiplied by a weighting factor of 0.1, resulting in ten weighted scores. The ten weighted scores were summed to produce a composite score of the DAT. The maximum possible TSRI score was 100%. We then generated TSRI mean scores for each school.

Independent t-tests and chi-square analysis were run to check for differences in the variables of interest between Phase 1 and Phase 2 schools. Multiple linear regression analysis was used to establish the most important predictors of school readiness. Variables that were known to be predictors of school readiness, according to past studies in Kenya [44–46], were entered into the model. Teachers' educational attainment was defined as the number of completed years of education. School enrolment was the total number of boys and girls enrolled in the school. Dummy variables were constructed to denote teachers' professional qualifications at two levels (reference = untrained), certificate-trained and diploma-trained. Head teacher support was established by recording the number of times the teacher reported that the head teacher had observed a lesson. Availability of textbooks was a dichotomous variable coded as "0" for "not available' and "1" for "available." Composite scores were developed by summing the scores awarded on component items for school facilities, classroom facilities and learning materials. The school readiness and composite scores were standardized to allow direct comparison across the two phases.

3. Results

As shown in **Table 2**, the mean age of teachers in both Phase 1 and Phase 2 schools was fairly similar (39 vs. 38 years). The majority of teachers in both Phase 1 and Phase 2 schools had attained college-level education and had certificate-level professional qualifications. Teachers in Phase 1 schools had slightly more teaching experience than those in Phase 2 schools; however, these differences were not significant. The main employer for teachers in Phase 1 schools was the county government, while those in Phase 2 schools were mainly paid by parents. There were significantly more teachers paid by the county in Phase 1 schools compared to Phase 2 schools, $\chi^2 = 6.143$, df = 2, $p = .046$.

More than half the schools relied on pit latrines for their toilet facilities. Whereas more than one-quarter of Phase 1 schools used water from wells or boreholes, nearly one-third of Phase 2 schools used piped water for their daily needs. More than half of the schools in both phases had working electricity. In more than half of the schools in both phases, there were no textbooks available. There were significantly more multigrade classrooms in Phase 2 schools compared to Phase 1, $\chi^2 = 8.415$, df = 1, $p = .004$. School enrolment was significantly higher in Phase 1 schools than in Phase 2 schools, $t(301) = 2.13$, $p = .034$. The majority of head teachers had not received any training in school management. The mean number of times that head teachers had observed

	Phase 1		Phase 2	
	N	**%**	**N**	**%**
Number of ECDE centres				
County				
Laikipia	50	32.5	42	28.2
Nairobi	27	17.5	24	16.1
Uasin Gishu	41	26.6	36	24.2
Siaya	36	23.4	47	31.5
Total	154		149	
ECDE teacher's highest level of academic education				
Primary	8	5.2	9	6.0
Secondary	39	25.3	35	23.5
College	107	69.5	105	70.5
Highest level of professional training				
Untrained	28	18.2	26	17.4
Certificate-trained	65	42.2	76	51.0
Diploma-trained	61	39.6	47	31.5
Source of teacher salary				
County	86	55.8	62	41.6
Parents	65	42.2	83	55.7
School/church	3	1.9	4	2.7
Head teacher trained in school management				
Yes	50	32.5	41	27.5
No	104	67.5	108	72.5
School facilities				
Toilet facility				
None	3	1.9	1	0.7
Pit latrine	96	62.3	86	57.7
VIP latrine	28	18.2	41	27.5
Flush toilet	27	17.5	21	14.1
Source of water				
None	2	1.3	2	1.3
Carried from home	25	16.2	29	19.5
Well or borehole	43	27.9	0	
Piped water	33	21.4	49	32.9
Rain water	19	12.3	17	11.4
Surface water	19	12.3	14	9.4
Water from vendors	13	8.4	9	6.0
Electricity?				
No	44	28.6	46	30.9
Yes, but not working	14	9.1	17	11.4
Yes, working	96	62.3	86	57.7

	Phase 1		Phase 2	
	N	**%**	**N**	**%**
Availability of textbooks				
Yes	69	44.8	71	47.7
No	85	55.2	78	52.3
Multigrade classrooms				
Yes	38	24.7	60	40.3
No	116	75.3	89	59.7
	M	**SD**	**M**	**SD**
Teaching experience (years)	13.09	7.36	11.89	7.52
School enrolment	28.23	19.55	23.86	15.96
Teacher age (years)	39.31	8.76	37.94	8.71
Number of times head teacher observed teacher	0.85	1.38	0.71	1.56
TSRI scores	33.12	8.13	31.66	8.07

Significance of bold value is actual p values.

Table 2.
Background characteristics of ECDE centers and teachers.

teachers in the classroom was higher in Phase 1 than in Phase 2 schools. The mean TSRI scores for learners in Phase 1 schools were slightly higher, but not significantly, than those in Phase 2 schools.

In the multiple linear regression (**Table 3**), a significant regression equation was found ($F(9, 210) = 3.426$, $p = .001$), with an R^2 of .128. Teaching experience, availability of textbooks and school facilities were significant predictors of school

	β	**S. E.**	**t**	p **value**
Constant		.714	1.762	.079
School enrolment	.125	.003	1.827	.069
Classroom resources	−.013	.083	−.174	.862
Teaching experience	−.143	.009	−2.031	**.044**
Availability of textbooks	.148	.136	2.199	**.029**
School facilities	.290	.071	3.837	**.000**
Head teacher support	−.090	.141	−1.354	.177
Years of education	−.158	.057	−1.867	.063
No teacher training	*Reference*			
Certificate trained	.116	.227	1.036	.301
Diploma trained	.025	.250	.210	.834

Table 3.
Predictors of school readiness.

readiness. Learners' school readiness scores decreased by 0.143 points for each year of teachers' experience and increased by 0.29 points where school facilities were better. Learners in schools where textbooks were available had 0.148 points higher than those in schools without textbooks. Based on the standardized coefficients, the school facilities variable was the strongest predictor of school readiness, followed by the availability of textbooks and finally length of teaching experience. School enrolment, classroom resources, head teacher support, educational attainment and teacher training were not significant predictors of school readiness.

4. Discussion

While research has been conducted to examine the adequacy of ECDE infrastructure in developing contexts, and the influence of ECDE infrastructure on learning, studies on the most influential aspects of school quality are non-existent. The study reported here sought to fill this gap. We examined different elements of school and classroom infrastructure, as well as characteristics of ECDE teachers to understand their role as predictors of young children's school readiness.

Our study revealed that school facilities played a big role in influencing children's school readiness scores, supporting the findings of earlier studies [17]. Noteworthy is that the majority of schools sampled for this study had toilets, water sources and electricity, suggesting that efforts had been made to ensure that these were available for young learners. The finding that school facilities impact children's outcomes has implications on the need to improve the infrastructure in public preprimary schools in Kenya, so that provision of these facilities is harmonized across all schools.

Whereas the availability of textbooks had an impact on learners' school readiness scores, more than half of the preschools studied here did not have textbooks. School materials such as textbooks enable teachers to implement the curriculum according to their learners' needs, and it is imperative that these are made available within schools in order to facilitate early learning.

The multiple regression results suggest that teachers who have taught for a long time produce poorer school readiness scores in young children. In an analysis not reported here, teacher age and teaching experience were found to be highly correlated. It may be that older teachers rely on "old school" pedagogical methods which emphasize rote learning and memorization. Such methods are not suited to young children, hence do not enhance their school readiness. One earlier study has reported that the types of engagement that young children encounter in prekindergarten settings impact their learning outcomes, and those that focus on individual instruction tend to be more influential [47].

Whereas other studies have concluded that ECDE quality is better when teachers have higher levels of education [48, 49], our results, although only significant at the 10% level, suggested that the more the years of education a teacher had, the poorer the outcomes for children. A review of earlier studies suggested that low associations between ECDE teacher education and child outcomes could be related to the content and quality of higher education programs [35]. Another perspective that has been offered is that perhaps the manner in which teachers interact with children, and their ability to "effectively implement appropriate curriculums" have a bigger influence on child outcomes than their qualifications [50]. Moreover, teachers' willingness to apply what they have learned into practice may be influenced by individual, social-cultural and structural factors [51]. Based on the null findings on the associations

between ECDE teacher education and child outcomes, we suggest, similarly to the views advanced by Early and colleagues [35], that improving teacher quality requires a broad range of professional development activities and specialized ECDE-focused training to improve pedagogical skills and interactions between ECDE teachers and children. Further, Siraj et al. [32], in their evaluation of an evidence-based in-service professional development program, found that it is critical to enhance teachers' professional knowledge, skills and attitudes in order to improve pedagogical quality and child development outcomes.

In the multiple regression results, school enrolment was only significant at the 10% level, which is in line with previous research that reports that group size is a more critical element of quality for children of younger ages (less than three years) than those of preschool age (four to five years). Surprisingly, ECDE teacher pre-service training, classroom resources and head teacher support were not significant predictors of children's school readiness in the regression model. These findings contrast those of other research which, for instance, reports that higher caregiver/teacher training [52], is associated with children's school readiness. The contrasting findings may be related to the differences across the contexts studied.

The results of the current study are important for researchers in the early childhood development field, as well as policymakers, as they highlight the aspects of structural quality that are most critical for school readiness in low-income settings. Promoting quality preschool programs has important implications for policy as it can lead to improved school readiness and later success for children in disadvantaged settings. Based on the results of our study, we recommend that in contexts with limited resources and competing budgetary needs, improving facilities in preprimary schools would go a long way in enhancing outcomes for preprimary school children. Apart from what happens within the school, it is also important to consider other environments within which the child interacts with others. As has been suggested by Rimm-Kaufman and Pianta [53], in order to improve school readiness, there is a need to leverage the resources within the home, school, neighborhood and community. One of the ways in which this can be done is by strengthening the connections between the home and school environments [54], as well as encouraging parents' involvement in school activities, especially among low-income families where such interventions are likely to have the greatest impact.

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Chapter 6

Having a New Point in Each Story: Potential Insertions of Theater in Childhood Education

Flávia Janiaski

Abstract

The purpose of this paper is to reflect on the possibilities of using storytelling as a way to insert theater in early childhood education. For that, I developed a Scenic-Narrative Experience based on the William Shakespeare's plays *The Tempest*, which had as its main objective the use of space and materialities to involve children in the story. Early childhood education, the first school stage for children, is a time of great change and development for them. All learning and cognitive, motor, physical, social and emotional development go through playful experiences and play. Two qualities that we find in theatrical work. In this way, the focus of the research developed was to place the telling, narrating and playing as elements belonging to the theater. In Brazil, early childhood education addresses children from zero to 5 years old; however, this study is specifically for children from three to 5 years old, addressing three guiding axes: storytelling, theater with children and scenic space. Having children as protagonists and research participants. Documentary analysis, fieldwork and literature review were present in the applied methodology.

Keywords: childhood education, pedagogy and theater, storytelling, William Shakespeare, education

1. Introduction

Which story touches me? Princes and Princesses? Warriors? Dragons? Which stories made me more certain of who I am? I believe that listening to variegated stories is a way of building a door for the imaginary. This imaginary is full of places, features and characters that will take people to incredible adventures. My aim in this research is to make the art of storytelling closer to the art of theater. Are theater and storytelling—different arts? Is storytelling still worth nowadays? Is it possible to unite the rich simplicity of storytelling with the theatrical esthetics? Is the essence of storytelling different from the theater? A storyteller, a story and someone to hear are necessary for storytelling. What about the theater? Isn't it true that also a text, an actor and an expectator are necessary for the theater? The difference between a storytelling and a theater is basically in the storyteller and the actor figure. The first will tell us a story. The latter will make it happen.

Then, how would it be possible to work with storytelling with children in a way they could be narrators, listeners and interlocutors in a story? How can I work the triangulation among my lens as an artist and teacher, authors who write about children, and children? Which stories "should" or "can" be shown to children of three to 5 years of age? Which strategies may I use to tell a story in which the theme and characters are dense and apparently out of the childhood universe? From the piece *The Tempest,* how revenge and forgiveness might reach children? What is the best way to make all this work moving from a class to a scenic space?

Looking forward to answer these and other further questions, I found out something quite clear: we are the outcomes of diverse histories and stories. Some of them are ours and some we borrowed from someone else, although each has a life of its own. It is not a coincidence that we cannot fix a date for when storytelling started to be a tradition nor if it is going to end 1 day: "The art of storytelling mixes itself with the history of humankind. The human being always had a need (and will always need) to listen and tell stories: for a better understanding of the self and with the world around in [1]". Of course, through time the way to tell a story changed: storytelling has another social function and its activities are promoted through other methods and shapes.

The art of storytelling was been transformed according to the changes in the world and humankind, but has always been kept alive. Stories and storytellers reappeared between the 1970s and 1980s in the European, US and Canadian scenarios and between the 1980s and the 1990s in Brazil and Latin America in general. However, storytellers are quite different from stories and traditional "narrators".

In general, at least in Western societies, storytellers accessed stories from oral tradition from the written rather than the listening tradition. Of course, most people have heard stories during their childhood, usually by parents, grandparents, teachers, and the like. However, contemporary storytellers had access to a huge range of narratives through books.

Living in the Era of "post" (modernity and so on) listening as a practice is often rare, although it is a human need: everybody has the need to "tell" the other about our lives. Our orality is "an artisan way of communication in [2]". There is not a clear line in which one tells a story or the story tells someone's life. In any case, we are all storytellers.

Nowadays, busy parents and technology (frequently substitutes for nannies or an entertainment to keep children well behaved) provide very rare opportunities for children to have new experiences. Even in kindergartens and schools, in general all children have similar experiences—some of them low-quality experiences—offered by professors frequently rigid in parameters or curricula. Educators get stuck into such norms that were supposed to be seen and used as references and guides.

It is worth to provide adventures for children through storytelling, theater and learning. Luciana Hartmann argues it is worth to provide narratives in theater classes, due to the fact that "we react to multi-sensorial stimulations provided by performance. Through that, we attribute meaning in [3]". Carefree learning is funnier and organic, thus more productive.

By letting footprints, fragments of history and their pieces, one can open up possibilities for children to fill spaces with own histories and references, thus appropriating history in a unique and particular manner. In other words, what is the problem of substituting the literality in a route by the sinuosity of creativity? Why to not work with uncertainty and the unpredictable? One thing I have for sure: the imagination cannot create from nowhere, from emptiness. For creating anything, we

need structure and construction, failures and successes, meetings and mismatches. Of course, there are previous knowledge, previous discoveries, combinations of ideas and generation of new ones. For creation, we need work, ideas, heart and sweating during all the processes. Like Benjamin [2] states, "storytelling marks as a mark left in the bowl of clay by the potter's hand: the art of storytelling is a craftsmanship forged with the essence of who does it".

2. Here comes the witch: the storytelling

One of the most world famous stories is Sherazade's (Sahrazad). She survived because she used to grab attention from the stories she used to tell, as she understood that her "audience" was instigated by what would happen next. Sherazade is a character of the classic piece from the world literature *One Thousand and One Nights* that puts together stories and folk tales from diverse parts of India, Persia and the Arabic World written from the beginning of the ninth century onward. It also became the most famous piece of the Arabic literature.

The basic narrative is that the King of Persia was betrayed by its first spouse and after that could not trust anyone anymore. Therefore, after spending some time with a woman in a night, the king used to kill them the next morning to prevent the betrayal. The King did so for a long time, thus killing lots of young women in the kingdom. One time, he met Sherazade and she offered him a marriage, as she had a plan to keep herself alive and save the other women from the kingdom. Sherazade agreed with her sister that she would ask Sherazade a last story before her death: a last wish. The King gave Sherazade's sister the wish and Sherazade started a story that fascinated and intrigued the King so he did not kill Sherazade. Therefore, the King would have the chance to know better about heroes, mysteries, adventures and fantasies. This strategy worked for 1001 nights.

Therefore, for 1001 nights the King awaited excitedly for another story from Sherazade. She told him variegated themes passionately, thus enchanting and instigating King's curiosity every day. At the end, the King realized he could trust on his spouse and could not live without stories anymore, giving up on the idea of killing and making Sherazade a definitive Queen.

The King had the opportunity to review his past and understood his new place. Therefore, his life did not have the need to repeat mistakes and costumes from the past and could be an independent reality. At the same time, while Sherazade was telling him stories, she built her own story, had children with the King and grew them up, which is, she was alive and active! She made from her language and narration tools against death and became the author of her own life and history.

This millenary story demonstrates well the power that a good story has to touch our instincts, convictions, worries, dreams, etc. It exemplifies the power of a history to take us from a reality and from ourselves.

Few things have the power to be old and contemporary at the same time as storytelling. The art of telling a story was perpassed from generation to generation through oral and then written traditions[1]. Histories/stories involving the secular and

[1] Traditional culture is an oral tradition. It is a culture guided by the symbol, and the tale is a symbolic manifestation that informs the function within this culture, as it "storages" knowledge to communities. Thus, it is right to state that tales are justified in a different way than Western cultures ruled by writing, in traditional cultures. Anyway, the tale is presented in both.

the sacred, perpassing gods, mystic traditions and bible stories[2], until more daily ones have been a way to teach costumes, religion, social behaviors, tradition and popular knowledge for a long time.

In general, storytellers had a privileged position in their societies, as they keep alive the cultural heritage of a specific group: "The storytellers were leading figures in the community because they were those who knew how to tell, based in facts, stories and myths, keeping alive the cultural heritage through the memory of the group. The storytellers drew stories from own experiences and from the knowledge obtained thereform. Therefore, narrating depended on the harvesting of knowledge from experience and their transformation into objects (visual, auditive, etc.) to be shown to others in [4]".

A way our ancestors chose to educate and alert their people was through stories, and their related experiences. "It is worth registering that the storyteller of tradition, such as *griôs*, had a social role that sometimes was more private and sometimes more sacred, thus this figure is blurred as the "proclaimer" of truth and thereby with strength to pronouce moralities, costumes, principles, memories and ideologies, even in communities that were not preliterate in [5]".

Navigators were also great story disseminators, as they were used to spending months in ships, going back and forth and doing commerce. The crew, to spend time and make the trip more fruitful, had the habit of storytelling. As people were not used to traveling, navigators used to bring with them news and narratives of other people, also using them to sell products and listening to histories of people in the lands. This way, navigators and peasants fed themselves with stories, knowledge, etc.

According to Benjamin [2], peasants and merchant sailors were the primary masters in narrating stories. Benjamin argues that both peasants and merchant sailors were responsible for the preservation of stories, as they were used to exchanging histories. While locals used to share local histories, navigators used to bring histories from faraway places.

In Brazil, in some archeological sites one may find some cave paintings of prehistoric groups that used to live in a region. Some indications that these people used to meet around a fire to talk or tell stories are in vestiges of bonfire, ceramics and other artifacts. "The art of narrating histories stem from ancient peoples that used to tell and perform stories to disseminate rituals, myths, knowledge about the sobrenatural world (or not) and acquired experiences through time in [6]".

In the African continent, the act of telling a history keeps alive and is a ritualistic character. This is something nearer to a sacred moment that is usually shared among members or a village or town. "In Africa, all is "History". The huge history of life includes the history of lands and water (geography), the history of plants (botany and pharmacopeia), the history of "sons from the Earth" (mineralogy and metals), the history of starts (astronomy, astrology) and so son in [7]".

Storytelling is an expression of daily manifestations in many communities, a routine: it is the moment to put everybody together around a bonfire or under a tree. Storytelling is also part of the home environment, as it is a tradition that perpasses the elderly and children. However, storytellers in the continent are inferior to a special figure with superior status in the African tradition: the Griô.

[2] It is worth saying that Jesus Christ preached through parables, so told stories and used metaphors, according to the Bible. The Christian tradition is based on biblical stories and the way they are interpreted: giving advices and dictating standards of conduct.

The Griô figure is nearer to a mystique in the African continent and has special and specific social functions. Overall, the Griô might be compared to the Spanish medieval troubadour. Griô is not a "position" chosen as a lifestyle or a profession. One is born as a griô and thus is part of a family of griôs. Griôs are not a choice but a destiny that one learns since the early age. As griô is not a profession, griôs do not get paid for their activities. Griôs work for their people. A griô has a cultural and comunitary memory and all requirements for the art of orality.

Besides a storyteller, a griô is a musician, poet, organizer, conciliator or emissary who intermediates the communication among ethnic African groups. Griô is an artisan of words, someone who conducts the ritual of listening, seeing, imagining and participating in the memory of a place. He is a person with social and historic function who saves and has been maintaining the African oral tradition at least for the past 700 years.

After about 400 years of human trafficking and slavery in Brazil (1530–1888), our primary cultural formation comes from African histories that once started in Brazil to be mixed to other narratives from different people who lived here. Although storytelling has a strong tradition in Africa and other parts of the world, through time this tradition developed from the family environment or bonfires to other places in societies[3]. Storytelling became a contemporary art: manners, techniques and tools changed and keep changing over time. A fundamental issue did not change: people like to listen to good stories, as we are influenced by them. Stories are part of our biological and social constitution: we are pieces of stories in a permanent making. Storytelling is still alive in Western societies tempted by technology and other mindsets.

A modern way of telling a story/history is the posting on social media, whether one is telling something new about the weekend, a graduation ceremony, time spent at the beach, the need of a friend and so on. If in past moments, our ancestors used to draw cave paintings, currently millions of people are accessing personal accounts on social media to do the same. Therefore, the jargon "Once upon a time…" has a huge range of metaphors and sounds like a metaphor itself. When people listen to this sentence, they are invited to have a body posture of listening. By "listening", people open their minds to imagination and emotions. A grandmother telling a story to a granddaughter is actually moving beyond any subject—love, life and death and so on. She is actually creating a space-time and getting into contact with her granddaughter in another level of interaction through a story and its metaphors. There's a pact between who tells and who listens to a story.

Stories also have the power of an experience. According to Merleau-Ponty, children live in-between reality and imagination and this experience might be enlarged depending on the situation. Reasoning is not logical in a child, thus his/her way to see the world is different than an adult world: there's another logic children inhabit that makes them think, feel and behave differently. Children understand the world from their own body and metaphors, such as adults—maybe more viscerally. Children create newer and richer metaphors that will be activated in their entire lives both in the real or imaginary world when they listen to *once upon a time.* Those who learn a story will know how to communicate to them.

Metaphors are part of stories. As in a symbolic structure, listeners of a story will trace their own journeys while listening to a story. Listening thus opens up a dialog with a literary work and a journey through its significances genuinely.

[3] Storytelling has its origin in oral tradition, but in-between the 1960s and 1970s it reappeared in Western societies inside libraries and schools, into the world of writing, thus not through oral traditions.

3. Look... are they dwarfs? Little ants? Fairies? No. they are children: storytelling, theater and childhood education notions, aspects and concepts

The relation between art and education is an issue that has been discussed for a long time: it seems it is necessary to advocate for obvious themes. Most important art-educators know that art and education is a successful marriage and a central combination for a critical, emancipating and creative educational formation of human beings.

As Desgranges puts it, it is necessary "to understand art as education while pure art, not necessarily educational art in [8]". Put in another way, the focus should be on the experience that art provides, instead of pushing children to rationalize and express verbally the result of an experience. Shall we give a rational meaning for all actions? According to Benjamin, when a person gives a meaning for a social fact, one can call that experience. Should this meaning be necessarily rational?

From this reasoning, there are two questions. First: how stories or the storytelling may get closer to children in the educational context? Second: how does the "royal wedding" between theater and childhood education take into consideration playfulness and the recreational needs of small children?

Storytelling has the power of instigating joy, observation, imagination, ludic issues, vocabulary, oral language and writing skills. Furthermore, it is a bridge between reality and fantasy: the two worlds that children inhabit. Storytelling as a front door to the theater or as a perpassing feature for doing art: it is the same of thinking theater as a potential contribution to the Childhood Education.

How is the relation between art and education perceived and experienced in the everyday life of a school? I would say that childhood education with art itself is surrounded and perpassed by arrangements that people would call mess, disorder and chaos and all of them might be true. However, what's the problem with mess, disorder and chaos? The order is a result of disorder: would it even be possible to create without experimentation, noise and movement? "Mess" might be a basic condition for exploring, creating and transforming one thing into another, a space in another to (re)construct new learnings and knowledge.

Curiosity is a fuel for learning. By playing and getting captivated (by art), small children discover the world and themselves slowly and in their time through building learning processes. At the Childhood Education, children understand the world through senses and imagination. They explore the world through vision, hearing and touch—not in a table writing words that make any sense.

Children learn to have fun: the essence of learning is ludic. Playing for children is a language and way of communication with the world and people around. It is also a venue for the expression of dreams, fears, creativity and acquisition of autonomy. Playing with games—the goal shall not be the competition, win or lose—small children get stimulated for team work and build up their social, moral, emotional, cognitive and psychomotor traits.

Games and learning have a direct and clear although not direct correlation. Put in another way, children do not play with the aim of learning a specific content or skill: children play for joy. Overall, when a game has a specific direction, joy is out of the game and playing has another function or essence. Learning is a direct consequence of playing, but that must not be its first aim.

Learning in games is spontaneous, natural and inherent to playing. Children learn playing and there is no need to rationalize the processes. Storytelling has a similar

process: by listening or telling a history (orality), children are having fun and learning. Thus, the ludic provides learning and has no intention of describing a formal process with duties, evaluations or the generation of a "product" at the end.

It is correct to say that a specific game will develop physical, motor or social skills: by running, children develop spatial and motor skills; by listening or telling a story, children develop orality, vocal repertory, focus and social interaction; by playing hide-and-seek and/or jumping rope, children learn to count and have autonomy, etc.

Variegated examples of the interrelation between playing and learning processes could be mentioned, but the point is: by jumping rope with friends and counting one to 10 to have fun, learning is an organic process mixed with playing. The knowledge of counting one to 10 is built naturally, thus it is not an imposition. In the opposite direction, when children have to jump a rope with the specific aim of learning how to count from one to 10, the fear of making a mistake will be a substitute for joy and fun. Tests and judgments might inhibit the learning process.

In this sense, variegated games and the potential of each for children's growth and learning could be mentioned, such as motor coordination, autonomy, vocal and body expression, body perception, balance, ability, imagination, creativity, logic thinking, etc., although the relevance of playing in the early childhood is not the focus of this work. However, it is worthy of mention that if children do not play, they will face challenges to read and interact.

Both through the storytelling and the theater, the learning process might be developed as the outcome of a ludic narrative. Thus, learning might be an outcome of a story or an attitude of the narrator. The encounter, sharing, complicity and exchange between the storyteller and the one who listens is the most important and more relevant factor: this provides the experience of a story or, better saying, a play. The experience of playing through a story is the opposite of a productivity thinking or the idea that everything has to have a utility.

From a child's curiosity and willingness, the tendency to explore games come into play. By playing, children understand and build their own perspective, identity and perception of the world. Adults and children live in the same world: the way each one of them understands and behaves in the world differentiates them. By playing, children learn to interact with the outside world and vice versa, thus they assimilate external knowledge and information to their internal experience.

Theater and education have the potential of uniting and complementing theory and practice at the time of learning, whereas children are heard and respected in their wishes and necessities. Theater in education might be understood as a venue for social, cultural and esthetic education.

Childhood Education has an important social task in children's formation, as its main objective is the education of a human being, as well as his/her relation with the world and other people. At the Childhood Education, issues, such as recognition, self-respect and respect for the other, are approached. All these issues are approached by playing and through body recognition: "By discovering manners by which we can develop body expressions, we discover new ways to move, new expressions and resources that we might use in relation with other bodies in social relations in [9]".

The relation between adults and children is central to the Childhood Education. Most modern educational approaches raise the relevance of professors as partners of children: not the professors who "have" knowledge, but the professors who *build* knowledge with small children. In this line of reasoning, Lev Semenovic Vygotsky (1896–1934) is central, as the researcher developed the sociohistorical-cultural approaches that later became the cultural-historical psychology. According to this

author, the social, historical and cultural situations are central to the development of human beings.

Vygotsky argues that human beings are in a constant process of lifelong humanization. In other words, children are not born ready but get dated influence for their intellectual development—historical, cultural, social and spatial. Therefore, professors are mediators to support children to interact with the world and themselves.

According to Vygotsky, the aim of (formal or informal) education is to support children in acquiring tools of their own culture. By teaching children know how to use those tools and a door is open for them to control their own behaviors, thus gaining autonomy and reaching the development of superior mental functions. Therefore, for this author the process of teaching and learning must respect the fact that children acquire tools in social interactions with adults and other children under different circumstances of formal and informal learning. In other words, for Vygotsky the main goal of education is not "to provide" children abilities and knowledge, but measures to support them in acquiring superior mental functions and own reasoning.

Vygotsky [10] then develops a theory of superior mental functions that human beings have. Elemental mental functions—such as reflections, motor development and perception—are native to human beings and animals. Those functions depend on the maturation to develop and include feelings, spontaneous attention, sensorimotor intelligence and associative memory.

Superior mental functions are restricted to human beings and are cognitive processes acquired through teaching and learning. At the superior mental functions-mediated perception, deliberate memory and logical thinking are promoted. Mediated perception is the capacity of concentration to a stimulus, for instance, distinguish and categorize a color or find a word in a page full of printed words. Deliberate memory is the tactics of memory to remember something. Logical thinking is related to our capacity of solving problems mentally through logic and other strategies.

All superior mental functions are acquired culturally, which are developed according to influences in the environment, common and specific cultural practices, and mental tools a culture develops to carry out such practices. According to Vygotsky [10], these functions become deliberate, mediated and internalized behaviors.

Deliberate superior mental functions are controlled by the person, not the environment, thus it is based on each person's choice. Behavior guided by superior mental functions might focus or be guided by specific aspects from the environment, such as ideas, perceptions and images and ignore others. Deliberate superior mental functions are not dependent on the environment immediately or directly but mediated by cultural tools.

To understand Vygotsky's theory, one has to have in mind four relevant concepts: interaction, mediation, internalization and zone of proximal development. Interaction is related to the fact that knowledge is a product of interpersonal relations, exchanges and interactions of a person with his or her environment: interaction is thus the result of a relation with the other and might be exchanged with a collective. The way children think, remember and observe is tailored by previous interactions with professors, parents and friends. In other words, what a child knows is worth, as well as how a child thinks and remembers the knowledge.

Mediation is the fact that knowledge is mediated by someone or some element, for instance, a professor, a book and education activity. Through mediation, superior mental functions are socially constituted and culturally transferred. Here comes into the scene the professor as mediator: the professor has cultural tools and is responsible

for the stimulation to make the student interested by them. By knowing Vygotsky's approach, professors can understand that their role in the teaching and learning process is more related to the development of superior mental functions than in a product.

Internalization is related to the process of internalizing culture, cultural tools and accumulated human knowledge. Human beings build and internalize knowledge through language, as it transmits superior mental functions: language and thinking are connected, thus when language and thinking are connected an external behavior gets mature into one's mind. Human beings build and internalize knowledge through language that will transmit superior mental functions: as language and thinking are connected, external behaviors "grow in mind" and keep same structures, focus and functions as their external predecessors. The so-called General Genetic Law of Cultural Development is the moment when all functions are constant in a child: "first, on the social level, and later, on the individual level; first between people (inter-psychological), and then inside the child (intra-psychological) in [11]".

The fourth and most important concept is the Zone of Proximal Development (ZPD): it is the reflection of the complex relation between learning and development and is related to the potential of becoming someone through the access of a "social other". This process might be facilitated by a professor, an adult or a friend. ZPD is the distance between the actual levels of development of an individual to solve problems alone (zone of real development) and the levels of development of an individual to solve problems with orientation or collaboration with more capable partners (zone of potential development) (Vygotsky, 1978). In other words, this is the distance between what a child knows by her/himself and what might be achieved with the support of another person. In-between zones, the learning happens, as this is a process being built.

The Zone of Proximal Development is a particularly important concept in theater teaching, when one thinks on the relation among children and the theater professor: such a partnership is a potential cognitive and social development of small children. Vygotsky says that a game is a source for ZPD: "Play is a source of development and creates the zone of proximal development in [11]".

Vygotsky chose the word "zone" because in his reasoning children's development is not linear but a continuum of abilities and skills in different levels. The word "proximity" refers to a limited zone of abilities and skills that will develop in the near future.

In sum, Vygotsky's historic-cultural theory or approach embraces complex actions combining two processes: natural and cultural development. On the one hand, natural development is biological; on the other hand, cultural development is an outcome of human beings interacting with artifacts and people so learning promotes development. In other words, children have to grow up to learn but some cognitive, social or language developments depend on what children have learned. Therefore, intelligence is a behavior that might be learned and taught.

According to Vygotsky, it is worth for children's development to talk with other children and adults about problems and concepts to understand them. The author used to say: imagination is worth and indivisible from real thinking in small children, thus they are also of worth in childhood development.

Vygotsky also highlighted the relevance of games for children's development, especially the dramatic or make-believe game. Children's performance in a game is better than in a normal situation of learning. Games are the "magnifying lens" for childhood development and children will perform above their overall potential: "In

play the child is always behaving beyond his age, above his usual everyday behavior; in play he is, as it were, a head above himself. Play contains in a concentrated form, as the focus of a magnifying glass, all developmental tendencies; it is as if the child tries to jump above his usual level in [11]".

Some researchers of Vygotsky tested theories. One of them, Zinaida Istomina (qtd. Roopnarine, 2013), compared words children between four and 5 years of age could remember in a dramatic game or in a situation of regular learning: a shopping list was given to a group of children to buy things in a bakery, thus a scenario was stated for them to play with other children and a normal list was provided to another group of children to memorize words. As the outcome, children who participated in the game memorized more words: "In a 4-year-old's play, we can observe higher levels of such abilities as attention, symbolizing, and problem solving than in the others situations in [12]".

From the social experiments from Vygotsky's theory, researchers demonstrated that make-believe develops abilities in children, as the capacity of self-regulation of physical, social and cognitive behavior, which is the capacity of children to follow external or internal rules, instead of impulsive behavior. In the make-believe, as in any other kind of game, rules must be followed and this provides to children space to the practice of self-control: playhouse, for instance, has rules such as the mom and the dad who behave differently from children; at the superhero, a hero and a villain are expected.

The make-believe and/or play freely also promotes the cognitive development of small children. At the time children play with objects transforming them—such as a block into a truck or the pencil into a magic wand—they develop the basis for the abstract thinking, splitting the object from its meaning. The game will be more fruitful if objects are not realistic, as in the above-mentioned examples.

Researches on children's development, as well as researches on children are part of the history of humankind and are still a concept to be revisited. According to Clarice Cohen [13], children's interaction in the world is related to the understanding of childhood. Although children always existed, the idea and/or concept of childhood is a modern issue. Childhood is a historical process built according to cultural and social characteristics of a time. Currently, children are recognized as people with rights, including the right to become a citizen. These rights are granted by world organizations, such as The United Nations Children's Fund (UNICEF)[4], as well as other organizations and laws around the world.

The school has a main role in regard to the social construction of childhood. With the raise of childhood or as its consequence, there are other specializations, such as pediatrics, development psychology and pedagogy [14]. Childhood as social category is constantly changing and has quite peculiar characteristics. According to Sarmento, the concept of childhood strengthened with children into economic spheres and has two directions: first, in peripheral countries with child labor and, second, in marketing issues as children are both promoters of products (publicity) and consumers. Currently, there's a market of specific products for children and it is growing.

There's a wild variety of cultural products for children in the market, such as cinema, cartoons, amusement parks, games, television and others. These cultural products generate other products, such as fashion, food, tools, educational material, recreational services, etc.: the list is long. Market for children is one of the biggest markets in the world and includes franchising all around the world. Due

[4] UNICEF is a United Nations' arm since 1946 to promote rights of children.

to globalization, children around the world—Japan, Brazil, the USA, Germany, etc. —access same products and share same preferences, although such accesses are unequal and exclusionary. For example, watch cartoon from Japanese studios; collect Pokémon cards; play videogames; read and watch Harry Potter; eat MacDonald's; watch Disney, etc.

However, it is worth to highlight that even if children have the same supply of products, they access them differently, both due to cultural and social context issues. Put in other words, at the same time children may access a "global culture", they live in "local cultures and realities". Another important issue is that all products children access were once developed by an adult that might stereotype children.

The end of childhood is often discussed as a consequence of a supposed loss of children's innocence and purity, based on the fact that children are often exposed to all places of social life, such as sexualization and violence. In this sense, two kinds of childhood are placed on the table: the real and the ideal childhoods. Therefore, children are in the center of postmodern debates. Children are often subject to labeling, classification, explanation and attempts to tell how their minds work, or how children think and settle relations with the world. Although these efforts aim to support children, they often aim to regulate and dictate how children should behave. Sarmento [14] divides cultures in the childhood into four structuring axes: interactivity, playfulness, fantasia from reality and reiteration. Therefore, according to Sarmento, children live in the world according to their interactions: through the culture of play, make-believe and zest for repetition. In sum, the concept of childhood or, as Sarmento puts it; Cultures of Childhood are reinvented, institutionalized and reinstitutionalized according to their historical moment. According to Sarmento, from the moment we recognize children as social actors, which is, as capable of action and interpretation. Therefore, societies must give children the right to participate in the processes of normalization of social lives.

Childhood was once invisible, ignored, romanticized, sanctified, demonized, cultured, etc., but currently children are considered as a social group with individuals capable of interacting with the world and are constantly reconfigured in the middle of urban, domestic and digital violence. Children are not seen as passive agents, empty of opinions or obliged to follow what adults impose.

4. Mirror, mirror on the wall... but is this theater or storytelling?

Which aspects of theater and performativity permeate storytelling? What is the line between literature and theater in the act of storytelling? What differentiates storytelling from history at the theater?

There are many debates about storytelling as an art by itself, or part of theater, or literature. My focus in this research is not to advocate for any topic. However, positioning my perspective in the research, storytelling is a performatic art (in the sense it is an artistic moment in which the storyteller is part of a piece and also a person is part of that piece). Thus, it belongs to the Scenic Arts—it is not theater, but shares with it common points.

The first argument of defenders for a differentiation and/or categorization between theater and storytelling focuses on the figure of the actor versus the narrator. While the actor "incorporates" a character, the narrator tells us about a character. This way, the narrator would present a character while an actor would be the character.

Another issue is the fourth wall in theater[5] but not in storytelling: in the latter, the communication between the narrator and the public must be direct. The issue of scenario is also raised: while in the theater it is necessary, in storytelling it is not and might happen in any place. Another issue is the fact that theater represents a story while storytelling tells a story. However, some storytellers are actors and some actors are storytellers. They question the line that splits these two divides that makes less and less sense.

Overall, these are the main arguments to distinguish storytelling from theater. However, theater and arts are being transformed and questioned about their forms and definitions. The frontiers among different artistic expressions—dance, theater, music, performance, visual art, cinema, etc. —are redesigned and redefined all the time and the line between one and the other is often undefined. Still, storytellers from literature expressions have another differentiation between the storyteller and the narrator. Storytellers would be actors/actresses aiming to interpret but not message, while narrators aim to share experiences and the making of a text or story. In the postmodernity lines between arts are "blurry", as a mixture and appropriation from one artistic form by the author give the tone of the era. The main tone then is the aim to do art that ends up mostly in experimentation that may potentially conduct the artist or artistic piece to various ways.

Furthermore, is it worth the question of which theater it's approached? Greek theater? Postmodern? Musical? Popular? Classic? What are the contemporary definitions of actor and theater? These issues, with no universal and definitive answers, are constantly changing and being scrutinized by researchers. I will point out worthy differences between the actor and the storyteller, instead of answering the questions.

Storyteller gives their body, soul, imagination, voice and sound to give life for a story that he might not have written originally, but will certainly retell, recreate and redefine each performance: they are performers of other authorships. Both the actor and the storyteller have a working tool to communicate with the audience: the body (physical body and voice). Both the actor and the storyteller give life to old or new texts through the body relation with the audience. However, the narrator blends real and fictional elements for situations from the past, while the actor works in live situations. "Oral narration of stories is an art fully developed only at the moment of a performance. As dancing, theater and singing, oral narration leaves incomplete tracks in the physical supports that try to save it. Oral narration's unpredictability is the measure of its vitality, as it is fully reached in the encounter with the recipient in [15]".

Hence, what is the actual difference between theater and storytelling? For me, theater puts the text in movement, while the storytelling puts the movement in the text: this is a worthy nuance. Maybe the main difference between theater and storytelling is the figure actor/actress x narrator: while the former represents, the latter presents. At storytelling, the narrator is a performer who presents himself or herself to the public and at the same time accepts intervention from the public. Elements, such as rhythm, intention and images, are worth in theater and other artistic languages, although differentiated.

Narrator or narration figures are worth since the Greek theater and perpasses all times. They might be noted in the narrator figure in prologs of Greek pieces (including the choir) and the Renaissance to narrate moments that are not revealed

[5] It is worth mentioning that the expression "fourth wall" is more "conservative" and a collective imaginary about a specific model of doing theater—the Italian stage. Thus, the "fourth wall" is not a reference of doing theater, as Brecht's, postmodern theater, street theater and others that do not have the "fourth wall".

directly in the scenes. In other words, instead of representing (doing) something, they would present (tell) that. Still, it might be the case that a courier in the middle of a piece just narrates a fact that will change or settle the next events, as medieval minstrels; the narrator at the epic theater from Brecht; actors in popular theater, etc., the fact is that narration and/or the narrator figure is always alive in the theater.

5. Dragons? Knight? Goblins? No! A tempest

Believe that people enjoy listening to and telling stories, almost as an inherent act of human beings. Tales of La Fontaine, *causos* of Ariano Suassuna, stories of the Grimm Brothers, *cordéis*, Disney fairy tales, Marvel and DC Comics adventures and heroes, tales of Marquees de Sade, urban legends, the Greek, Roman and Egyptian myths... The truth is, the major part of knowledge we have is being transmitted from generation to generation through storytelling, both oral and written. Historical facts, real or fictitious stories: stories are alive in every culture around the world.

The storytelling itself provides children the discovery of the world through the presentation and resolution of conflicts. Therefore, working with the plot of *The Tempest* could be a way of provoking children to reflect so they could sharpen and stimulate critical sense. Playing raises questions about cause and consequence, action and reaction, showing that our choices pave our ways. Playing might be good, bad, dangerous, helpful and susceptible of praise and/or reprehension and is always a result of our decisions and actions. The main character pursued—through knowledge—humanist values and believed in the capacity of realization of men. Another interesting component is relative to the dispute and use of power that runs through the whole play, reaching directly or indirectly every character in this story. *The Tempest* could serve as a way of taking distance from children stereotypes, so it is a method to work with human elements that are presented in all ages. Nevertheless, this has to be made with aesthetical and ethical care while we are dealing with children, that is to say: at the same time, the play brings elements of a fairy tale, it also works with the reality of human relations.

Another reason that led me to choose this play was the place where everything happens and the message it leaves to us. Every action of *The Tempest* happens in an island, just like a world apart where everything is permitted, almost through some kind of enchantment, letting everyone to manifest his or her real feelings. The island allows the meeting with the other, and the creation of a net of relations between the characters, a web of affectionate, philosophical, social and political relations. Since the objective is the Scenic-Narrative Experience in the Centers of Childhood Education, thinking about a specific scenario was the only way to ease both the production and the comprehension of children about the proposal parts.

Many people, including educators, could question the author and the play we choose. However, I think that when we show to the kids just happy-ending or "childish" stories, we end up underestimating the imagination and the small children's capacity to understand. From an early age, it is important that they have contact with stories that are capable of sharpening their curiosity: stories that raise dilemmas and reflections. Bringing closer the fantasy of reality—where the children will live in a determined real situation, but hypothetically—is a way that children have to build a sense of right and wrong, cause and consequence. Furthermore, this is a way for children to live emotions, like anxiety, anger and vengeance, in a positive way. Thereby,

they can glimpse at tangible possibilities of resolving their own inside dilemmas and external conflicts through the plot.

With a chosen story, then we managed to understand it better: studying its lines and interlines of secondary speeches, the character's nuances, and even what and how could the storytelling proceed. The idea was to be faithful to the story of *The Tempest*, but the question we discussed most was the issue of fidelity to the written play. How could one naturally tell a story from a script considered far-fetched and hard to understand? How could one put words into movement? The first step would be to understand a story and our personal interpretation of it. The piece approaches power, good and evil, illusion versus reality, vengeance, discovery and redemption.

Analyzing the play, we can divide it into three branches: power, comedy and romance. Yet, when we start to deepen this analysis, we discover that the whole plot spins around a fight for power, that is apparently present in one of the cores, but that permeates and connects the three of them.

In the romantic core, there are Ferdinand and Miranda, but also Prospero who desires the marriage of the young couple, so his daughter can become the princess of Napoli. Therefore, as soon as he gets back to Milan into his dukedom, he will have influence in Napoli through his daughter. Just like other Shakespeare's plays, the conflict between families and/or parents ends up to be solved through their sons.

In the comic core, the sailors Trinculo and Stephano (who represent, in the play, the people in general), even drunk, are instigated by Caliban to kill Prospero and govern the island. When Caliban transits through this nucleus, he plots the death of Prospero, so that he does not have any kind of power upon the island or upon him anymore, in an opportunist kind of conspiracy. Also in the same nucleus, the sailors seduce Caliban—the island is native—with a "drink of the gods" for him to show the wealthy and the beauties of the place, just like it happened when the Portuguese arrived in Brazil, offering mirrors and other tools to the Native American people.

In the nucleus of power, the relations are clearer: on one side, Prospero is willing to return being a duke. On the other side, his brother Antonio and the Napoli king's brother (Sebastian) are willing to kill the king and take the power of Napoli. At the end of the play, Shakespeare prepares his *grand finale* gathering the three nucleuses in a common scene to the settlement of scores.

Regarding the message of the play, I think that it has a critical particular and timeless function. In a symbolic way, it speaks about encounters between different kinds of life, culture and social organization; different kinds of thinking, acting and different moral values, composing a plurality of worlds that Prospero tries to control.

5.1 Transforming *The Tempest* in a new story to be told

Every story has a beginning: a door through which we enter in the plot. Nevertheless, the beginning does not mean necessarily the beginning of the story, or determined chronological way of telling the facts that we should follow. A beginning means a starting point. It is like a house with many windows that you can come closer and choose any window to spy. As far as you choose a window, a new part of the house will reveal itself. The same thing happens to the story, because you can choose where to "spy" first and that is your beginning. After all, the stories also have many sides, various parts and "rooms".

With the story chosen, it was time to think about how it was going to be told. The main objective was to work with theater and spatiality in storytelling, thus creating opportunities to link action and feeling through the children's bodies, contrasting to

an essentially verbal approach. In other words, the goal was not to transmit a specific knowledge, or any kind of formation to the little ones. On the contrary, the mixing of the process and the product, the spectator and the storyteller, reality and fantasy was the goal. The dramatic line to tell the story would keep not only a few characteristics of the original narrative, but also the embodiment of some characteristics of modern types of narrative. The actors/storytellers should not memorize the text, or parts of it; they should understand it, be hypnotized by it, so children hearing them could be "hypnotized" as well through a personal encounter with the story. We wanted the storytelling with freshness and a corporeal rhythm that would communicate to children a sense of freedom and confluence, so they could appreciate the moment and be willing to know what would come next.

An important point was the public would stay in the middle of the room. They would be in the center of the action, and all the rest (narration and scenes) would be surrounding them. This disposition of the space would also serve to instigate and call children at any moment to direct their eyes and bodies to a different space of the ambient. Thereby, we blurred the idea of the spectator as someone seated and inert watching passively at something that would happen in front of him or her.

As every action of the play happens in an island, the plot might be divided in the nucleus, so we thought about making children try the sensation of also being on the island, which would be divided in different parts as well. This division, as a way to identify the nucleus and characters, would provide a better understanding of the plot by children. To symbolize this "division" of the island, we chose to work with different colors to each core and to materialize these spaces and colors, we used carpets.

In this way, we agreed to work with five colors of carpets: blue, red, green, brown and orange. The blue carpet would be in the middle, where the children would also be seated (at least most of the time); the red carpet would be in the entrance, at right, representing the part of the island where Prospero and his daughter Miranda live. The green carpet, in its turn, would stay at the back in the right side, representing the part of the island where the nobles are residing; the brown carpet, in the left side at the back, representing the place of the island where Caliban lives, where he meets with Trinculo and Stefano. Finally, the orange carpet's position would be in the right side at the front, representing the part of the island where Ferdinand was lost. We decided that Ariel (spirit of the air) would be the only one to move freely around every nucleus/part of the island.

From the beginning of the research, I was convicted that I wanted to tell a story in a different way, so children would not be mere spectators. The aim of making the story a reason to play with children should provide them sensorial and cognitive experiences, thus aspects as sounds, smells, visual stimuli, etc., were worth as the environment that would invite children to get involved with a story.

The idea of making the storytelling with Shakespeare and theatrical principles was also a way of allowing spaces for the experience that could solve the frontiers between formation, theatrical action and artistic reception. Therefore, it was necessary to think about a scenic environment that would enable children to enter in a fiction ambient with visual and sensorial sensations.

The child does not necessarily tell the story but does participate actively in the storytelling through games and jokes. Therefore, scenic and audio environments and the objects should be of particular relevance for children to activate or develop affective memory, thus creating records through storytelling and playing at the same time.

Having playing in mind, I started to search for a scenic environment that could open up the possibility for children to try the sensorial story and emotionally in their

bodies, besides listening to it. Thus, they would have a space in a threshold between fiction and reality that could stimulate interactions among children and the environment, thus sharpening imagination and providing the possibility of increasing their perceptive horizons.

Dewey, as much as Vygotsky, described how important is a physical environment enriched with materials and objects. This ambient affects directly children's behavior learning processes. Likewise, it was important to organize and select the materials and objects that we would have in our story, for instance choosing how it would be organized in the room.

At the same time, the environment needs to be a place of complicity and confidence for children to feel safe to play. This was one of the reasons that led me to choose that the storytelling should be in the same space that children would attend, like children's educational centers. However, it was necessary to create a different atmosphere from the daily life to promote curiosity and imagination for the story.

There were many elements to think of. I was searching for a scenic environment connected to the fictional context of the story and capable of generating a material that would give support to the narrative, thus transmitting safety to children release themselves and get involved with visual, sonorous and tactile stimuli. I believe that when we embrace plastically, audiovisual, musical and linguistic aspects, the work can mobilize sensorial, motor, symbolic, affective and cognitive dimensions of children.

At first, I started to work with triggers and/or scenic devices that could help to build the narrative and unravel the story piece by piece—layers and not necessarily linearly. The aim of the work was that the children could have to perform their own experiments with these objects and the narrative because creativity can be learned and stimulated. Therefore, materials, time and encouragement are needed from people who conduct these activities. I believe that the teacher can build or promote the learning space of students: "when children have opportunities to be creative, their language, social and cognitive skill grow" [16].

However, the actors/narrators had difficulties in telling the story through the objects. Although I said they could insert elements in their stories that were not in Shakespeare's pieces, they were really stuck to the written story. The thought that "if the actors cannot do it, how could children be able to?" started to emerge. After performing some further experiments, we decided that the story would not be told through the objects, but with them. We changed the focus to think about ornaments and scenic elements capable of characterizing the space where the story was going to happen. From then on, conditions were created to discover how we would tell the story of a *tempest*.

In the search for a scenic environment that was capable of becoming an immersive ambient for the children to feel stimulated to explore the space, we started to look for fictional elements with a potential to become concrete objects. The first idea that came to our minds was the "transportation" of children to the island where the whole action of playing happens. Thus, the storytelling should happen in a closed space: a classroom.

We wanted to have architecture as a reference to make associations between the space where the characters were stuck: in other words, an island and the classroom where students are "captivated" most of the day.

From this thought, we considered that it would be important to work with a materiality that could go beyond the five senses (tactile, hearing, sight, palate and sense of smell), in a way that the dramatical process of the story could be stimulated.

The story would be found and woven gently by the storytellers and the children. It is important to say that all intentions and objectives should be rooted in the act of playing games and/or other plays. That reminded me of something very simple, but that delighted me when I was a child and is still a source of joy: the tunnel.

In many public spaces with reserved areas for children, there is a concrete tunnel for them to go through, as well as closed slides in a tunnel form. In indoor parks (shopping centers and children funhouses), there are toys with tunnels. In children's programs, there are tests where children need to walk through a tunnel and so on. The examples are many, and I thought they were a good idea to start the storytelling, because to enter a tunnel seems to be a good way of stirring up the imagination with children.

After some experiences, our story would start with one of the actors/storytellers going to the children's classroom and asking them to be part of an adventure. To begin with, children would have to take up a courage test: they have to pass through a *tempest*. Lanterns are then distributed to them and they enter with one of the actors/storytellers in a dark tunnel where they experience the storm. Outside, the other actors/storytellers make sounds that remit to a *tempest* at the sea (thunders, bolts, wind, storm, rough sea, etc.) while they say some phrases to start the play.

The invitation for children to enter the tunnel is a way of awakening the curiosity in them to get into the "unknown" and live an adventure. It is also an act of intentionality, in which every child can choose if they want to be in a tunnel or not. Participating in a storm inside a tunnel manufactured with black cloth is a simulation of a certain reality but with concrete elements that allow imagination and creativity to arise.

I preferred to put the actors/storytellers outside the tunnel, so that they could realize the sonorous ambiance apart from the "scene". This was the beginning of the play, and the starting point of our storytelling was directly connected to the experience of fear and the capacity to overcome it. Fear was a question that worried us because we always thought that the scene inside the tunnel with the storm narration in the dark could frighten the children in a way that would make them want to come out of the tunnel, instead of being stimulated to face it. Thus, we decided that each child could choose if he or she would like to cross the tunnel or stay outside it. Those who chose to stay out of the tunnel would be invited to help us create the sound effects of the storm.

For this purpose, we provided X-ray sheets, *rain sticks* and letter-size paper sheets and asked them to blow and to make sounds with their mouths that reminded us of the sound of the wind. This way, they would get interested and curious—both children who decided to enter the tunnel or those who chose to stay out.

When the sea and the *tempest* calmed down, the children are invited to get their boats (paper ships—origami—hung along the tunnel, but not opened yet) and to get out of the tunnel. For those who chose to be outside the tunnel, one of the actors/storytellers would give them the boat. The way out of the tunnel leads them to the entrance door of the room. Once at the door, the children are suggested to leave their lanterns in a wooden box and to open their boats to be able to get to the island. With the boats in their hands and oriented by one of the actors/storytellers, everyone goes sailing through the room and "discover" the island until they sit in the middle (blue carpet).

In every island's core (carpets), there would be a rack on the floor with accessories that would distinguish each character in the course of the storytelling. In the cores, there would also be a stair (to symbolize a tree) or wooden cubes. The actors/

storytellers are wearing overalls of different colors, with specific clothes to make the narrator, and put on the accessories/objects every time they will play a character. Everyone passes through the attribution of being a narrator or a character during the show/storytelling.

With everyone—spectators and actors/storytellers—inside the room, the five actors/storytellers would start to present Shakespeare to children, speaking about the story in some kind of introduction before starting the storytelling itself.

During the whole show/storytelling, children are expected to participate actively, going through the experience of being inside the story through games and plays, as telling a story is a way of giving life to it.

I would like to highlight specific moments of the storytelling where the children are invited to play and to interact with the story:

> ** Scene 1 - Caliban and the sailors: they go out to kill Prospero, find the kids, think they are very sad, distribute small bottles with magical grape fruit and ask them to play circle games. They make two circles and play.*
>
> ** Scene 2 – Marriage between Miranda and Ferdinand: soap bubbles are distributed to the public, so that they can make the magical party Prospero ordained Ariel to do.*
>
> ** Scene 3 – Caliban does not want to fulfill his tasks: Ariel distributes feathers to the children to tickle him.*
>
> ** Scene 4 – Caliban and the sailors go to Prospero's cave to kill him: first, one of the actors/storytellers plays "statue" with the kids and then "teaches" them to imitate a dog. When Caliban and the sailors draw near, everyone turns into a statue. When they go to get the statues, they "transform" into dogs and chase the sailors and Caliban.*
>
> ** Scene 5 – Antonio plans to kill the King of Napoli: some children are chosen to wear vests and receive the rack's "hooks" to "watch" if no one is coming. Other children receive whistles and keep "monitoring" to wake up the king in the right time to avoid his death.*
>
> ** Scene 6 – Ariel, under the orders of Prospero, tries to drive the nobles mad, giving them visions of a feast with music and spirits: fruits are distributed to the children.*

These are some moments of interactions between public, story and actors/storytellers. In the course of all the storytelling, children are instigated to participate, relate with the objects, be part of the scenario and to use the outfits. They are invited to sing, dance, play, move from one island to another, to eat fruits and to drink magical juices, etc. In a natural way, children take control of the story, becoming characters and/or accomplices of the actors/storytellers, "performing" and making theater.

In all moments, elements and sonorities are made available to displace children between reality and fiction, so the spectators are involved and stimulated to build their own images of the story. These images are triggered from the space and its ambiance. Regardless of the idea of informing, we privileged the idea of forming. In other words, we should tell the story that Shakespeare wrote but want children to live the story or "understand" the story according to their own way of understanding things.

According to Desgranges [8], the spectator is not someone who assumes a passive posture in front of the artwork, but someone who is there to draw up his or her own particular interpretation of it. The "understanding" of determined artwork is not given as something immutable by its creators, and is being constantly built and rebuilt by its spectators through a creative, productive and authorial act.

Finally, actors/storytellers sit around children asking them to tell their favorite stories that could be true or invented. Each one of the five actors/storytellers keeps a group of children and stimulates this group to choose their favorite characters of stories they know, to tell stories they know and to choose drawing as to what symbolizes these characters. The actors/storytellers use a body painting pencil, make drawings on the kids and paint their hands, faces and shoulders, and vice versa.

6. Conclusion: another point... follow the yellow bricks road

We presented the Scenic-Narrative Experiences in the five Centers of Early Childhood Education in Brazil in 2018. In this conclusion, I'll try to answer some questions: what kind of experience do children live with their presentations? What kinds of questions were raised through the experiences? Was the Scenic-Narrative Experience really a free space for children to play, or did the actors/storytellers direct it all? Was there any kind of theatrical learning?

Before I answer these questions, it is important to say that in 2016 and 2017, I developed workshops with teachers working in these early childhood education centers. In these workshops, I worked on storytelling using summaries of Shakespeare's plays, so that later these teachers could experience in their workplaces what was experienced and produced during the workshops. It was also the objective of the workshop to collect data on how teachers understood and work with storytelling in their own daily routine and what possible bridges or connections we could make with theater. The idea was to awaken in the participants an interest in new possibilities and ways of telling a story, permeating literature, but mainly with a focus on the body, sensations and discoveries of new paths through storytelling. Then, we presented the scenic-narrative experiences.

As every presentation happened in the classroom space, this apparently common place turned out to be part of the narrative as it was transformed into an island. Children interchanged the roles of the spectator or performer during the Scenic-Narrative Experience, thus mixing up narrative and performance. Children played in a familiar space and gave a new meaning to it. In doing so, real and fictional roles were mixed, as each kid constructed a particular narrative of the story through theater and performance playing in a playfulness space.

During the Scenic-Narrative Experience, children lived and thought with autonomy in an environment they were heard of and respected: active human beings with autonomy in the process of teaching-learning. In the experience, I was willing to understand to which extent children based their experiences on their own will and were interlocutors and creators of the story they were living together.

The search for a rational understanding of the story was based on senses, relation between body and space, feelings and other issues that promoted imaginative activities. In other words, through imagination, creativity and emotions, children built meanings and feelings to the reality around them.

Imagination is an incentive to build a "reality" in other terms: the way some situation could develop with some magic and color, the invention of the impossible

through different sensorial stimuli beyond exchange of information and the forming of relationships. Building a meaning to the story through the qualities' imagination and embodiment in as an environment of cognitive stimulation is different from accepting a meaning assigned by others and is more substantial.

Thus, in the fieldwork we had some time for children to absorb the Scenic-Narrative Experience in their own way: no obligation of trying to rationalize through words or drawings. Each child had sensations they experimented and a painting (in a certain part of their body) of characters of their stories—and not necessarily of the story that was being told. Subjectivity, sensitivity and imagination, instead of objectivity and reason, were the subjects being researched. I searched for an experience that, according to Larrosa [17], would produce effect and leave some traces or impressions.

The Scenic-Narrative Experience was built to involve every participant with sensations, so that each could live an experience that went through all personal senses. Therefore, all participants were part of the story that was being narrated, performed and experienced. The objective of this experience might construct the learning process through lived experiences in a fictional context inside a space of creation and fun.

For the proposal to work, availability of children was needed: they were supposed to participate in the game, the scenic and sonorous environment, thus diving into the story, touches touch and let. In this way, they could sharpen their senses and perceptions, provoking the feeling—not the rational thinking. Constructing a space that made children feel safe at the same time that instigated them was crucial for children to play freely with the story, and to relate it realistically with the fictional context, thus getting immersed in the act of playing.

Because the space was at the same time the island of Prospero and the classroom of the participants, they felt safe when they saw their names in the lockers, their toys in the right place, their backpacks, etc. However, at the same time there was also a variety of new and unknown elements that provoked their curiosity; things they could touch, move, take, etc.

During presentations, we were not willing to guide children. Orientations were given, but children were free to move from an island to the other or even get out of the classroom. Because of that privilege given to children, it was necessary to speak with other teachers and auxiliaries that they were not supposed to interfere, but to ask children to keep seated down and remain silent. In order to make the idea of playing work, it was necessary to leave children free to enter or not in the game, to look or not to at a scene or narrative, and to accept or not to play with us.

Although the focus on listening was given, other types of focuses are also worth—vision, tactile perception, smells and tastes. Therefore, searching for a logic that could reach feelings rather than rationalization of verbal communication was also a goal. Thus, children's understanding of stories was never an objective.

The physical proximity with the artists allowed the children to touch, grab, pull and watch actors/narrators, thus provoking complicity and fellowship among them. This intimacy generated confidence and in fact they felt invited to be part of what the story and gradually the lines between production and enjoyment were getting dissolved.

Another factor I considered important was the end of the story without formal issues, such as applause or chats. The story ended up with everybody seated and sharing own stories like in a game: "I just played; now it's your turn!"

As Piaget (1928) skillfully states, children build their knowledge through the interaction with the world around and this is the reason why it is important to have

the freedom to touch, see, explore and manipulate different objects, thus allowing children to participate in different games and plays, singing, dancing, jumping, moving, etc. Put in other words, children must have daily opportunities to express their creativity, and I believe the Scenic-Narrative Experience is such opportunity.

After listening to the story and having the opportunity to tell their own stories at the end, children had the chance to "woven narratively their experience," and through this experience they were capable of understanding themselves as cultural subjects. Like Girardelo states: "Through listening stories [...] and perceiving their own stories being listened, children woven narratively their experiences and by doing so they constitute themselves as cultural subjects. By getting into a narrative game teachers and children increase the common symbolic space full of images, corporal and cultural reverberation of their voices – the scope of the children's education. Thus, they become human beings that are narrated and narrators with all the favorable implications of it to the personal, social and cultural life of each and of the group in 15]".

During presentations, children were able to get involved emotionally with the story and communicate with each other. I believe they had their creativity sharpened and a greater interaction with the group. Through the game with their pairs and with narrators/storytellers, the capacity of a group working and solving problems was stimulated. This quality of interacting with the other and solving problems will help the child to develop posterior abilities like writing, mathematics and the capacity of solving misunderstandings with classmates.

One of the main characteristics of the contemporary theater—performativity or postdramatic—is the dilution of its borders with other kinds of art, like visual arts, performance, dance and music. In the storytelling, this happens as well, as Fabio Medeiros says: "It is not necessary too much effort to cross the art of storytelling with other artistically languages, because they are settled on the back and forth of arts, bit directly or indirectly. Painting, theater, pantomime, dance, music, opera, cinema, animation, architecture, sculpture, technological arts, games and television: they are the soul of human beings in [18]".

The Scenic-Narrative Experience was similar, as besides games and playing different artistic languages were employed, such as music, visual arts, theater and dance.

When one thinks about formal or informal theater's learning practices in educational spaces, the discussion about contemporary theater is necessary. Thus, we need to propose a construction of knowledge that might arise from the experience provoked by game and theatrical practice. This way, people do not become captive to rules and methodologies. On the contrary, each technique or methodology has to be considered as possibilities and should be reviewed with a look that converges with artistic practices of the theater professor.

Daily routines of classrooms—accomplishment of a high loading time schedule, fulfillment of plans and diaries, planning, meetings, following parameters, guidelines and curricular base—frequently give little room for creativity that goes beyond school parameters. Nevertheless, educators should keep in mind that the educational nature of art is born from experience (Dewey). Certain knowledge we learn by doing, so through the experience of acting.

For this reason, every scenic and audio conception of Scenic-Narrative Experience came from the idea that it could work as a trigger or dispositive that produces sensorial stimuli on the spectators. This can be made by the offering of materials that stimulate and explore children's possibilities, instead of seeking which answers they would give to these experiences: no predefined objectives should be stated, thus

opening up space for the uncertain and unexpected. Therefore, the actors/storytellers have to be prepared for improvising and the unannounced.

I believe in the pedagogical power of theater that lives in the aesthetical and collective capacity of awakening different ways of thinking and affecting children's behavior through their exchange with pairs. In this sense, the Scenic-Narrative Experience is capable of generating a perceptive experience of narration of a story. When children live their adventure in an island, they participate collectively in a fiction with own body, sensorial and cognitive experiences. Each object or scenario has a symbolic value for the story but also evoked curiosity in children. To achieve these objectives, a creative scenario for interactions of children in theater through storytelling was provided.

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Chapter 7

Community Approaches to Funding and Supports for High-Quality Early Care Experiences: A United States Example

Larrisa-Lei Wilkinson, Emily Diaz, Lauren Decker-Woodrow and Sarah Baray

Abstract

While much research has validated the importance of high-quality early learning environments to achieve successful long-term outcomes, providing such environments for all children continues to be a challenge. Debates and varying opinions of how to best use and direct funds to early education and care, as well as determine levels of support to increase quality persist. To address these challenges, a large urban city in the United States has taken a multi-faceted, community-based approach to both funding and quality implementation supports. In the chapter, the authors will first detail examples of funding and provision challenges and provide examples of how cities have sought to address these challenges. Second, the chapter will detail the specific approach to funding and support in the example of focus. Third, the authors will present findings to date on the quality of environments and return on funding investment. Finally, the authors will conclude the chapter with recommendations for increasing access to high-quality early care experience in other contexts and environments across the globe.

Keywords: community-based programs, early care funding, high quality interactions, shared service models, early childhood education

1. Introduction

While decades of research demonstrate the importance of high-quality early childhood education, in the United States federal and state governments provide only limited public funding for early learning. As a result, municipal governments are increasingly using local funding sources to provide more equitable access to high quality early childhood education and care. This chapter will highlight the challenges to obtaining adequate funding and how cities have used creative methods to provide educational opportunities for young children. The featured example is an innovative, comprehensive community-based program in San Antonio, Texas: Pre-K 4 SA. The chapter also includes strategies to inspire and spark creativity for how early education

and care across the globe can be funded to implement quality supports in local contexts and communities.

1.1 The importance of funding high-quality early education and care

Providing high-quality early education and care experiences for all children is a global priority. In fact, the fourth sustainable development goal of the United Nations is to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". A target of this goal is by 2030, all children will have access to quality early childhood developmental care and education [1]. Within the United States, there is not a comprehensive system for education and care from birth through age five. Instead, it is provided through a combination of federal, state, and local policies and programs [2]. Formal schooling for children starts between the ages of five and seven years old depending on the state in which a child resides [3]. Research on the period of education prior to formal schooling has been ongoing for decades [4–15]. A comprehensive meta-analysis of 123 studies on early childhood programs in the United States provided evidence that preschool (defined as programs prior to formal schooling) by itself can close half the achievement gap between low- and high-income students [16]. When considering the research evidence of early childhood education in the United States, two pioneer programs often cited are the Perry Preschool program and the Abecedarian project [17, 18]. Both were rigorously designed using experimental methods and found long-lasting impacts of high-quality preschool education. These benefits include children entering formal schooling better prepared and less likely to repeat a grade, higher I.Q. scores, greater achievement test scores, increased likelihood of attending a 4-year college or university, having a skilled job resulting in higher lifetime earnings, owning a home and car, and improved health outcomes. At the same time, there was a reduction in the likelihood of being a teen parent, reporting depressive symptoms, and committing fewer crimes [17, 18]. Taken together, high-quality early childhood education provides short- and long-term benefits, as well as a pathway for children to mature to their full potential.

While much research has validated the importance of high-quality early learning environments to achieve successful long-term outcomes, providing such environments for all children continues to be a challenge due to a lack of adequate funding [4–15, 19, 20]. In 2015, only 0.33% of the United States Gross Domestic Product (GDP) was spent on early education while the average public spending among the Organization for Economic Co-operation and Development (OECD) countries was 0.74% [21]. In the United States, early education and care is funded through federal, state, and local systems in a piecemeal fashion, creating a disjointed governance structure controlling multiple funding streams with diverse priorities and targeting different populations of families. Although 44 of the 50 states have universal public preschool programs, these programs only serve approximately one-third of four-year-old children in the country [22]. Additionally, many of these programs lack key quality benchmarks for providing and implementing instructional supports that are necessary to obtain the lasting benefits of preschool [19, 22]. In order to operate, programs must blend multiple funding streams at multiple levels [23]. Therefore, greater investments are needed to expand access to serve more children in high-quality early learning environments.

In order to ensure young children have access to the critical resource of high-quality early education, cities have become creative in identifying potential funding sources and seeking strategic collaborations to support early learning initiatives

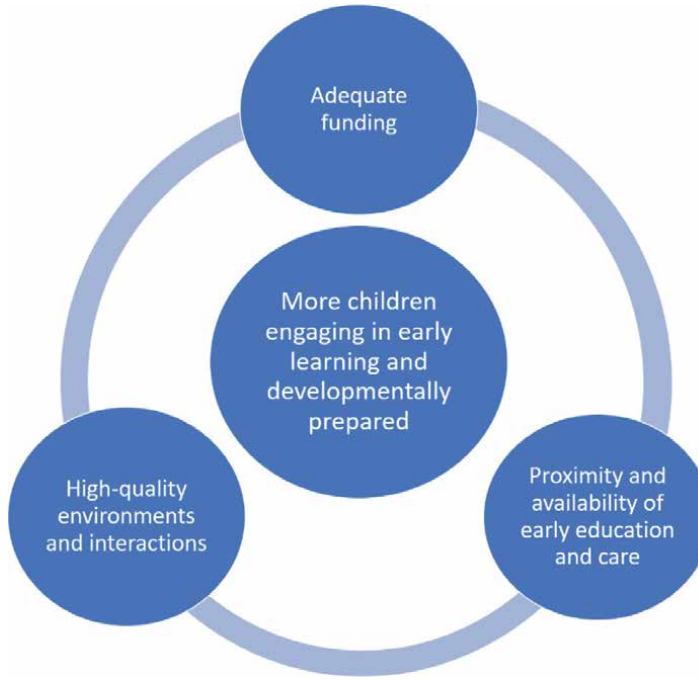

Figure 1.
Visual representation of necessary resources to provide high-quality early learning.

to meet the needs of their communities. Early childhood education has proven so beneficial that The Centers for Disease Control and Prevention (CDC) have identified these programs as an important and effective tool to improving community health. Local funding for early learning programs is touted as one of the best non-clinical cost-effective approaches, since investments in high-quality early education generate positive health results within five years that persist over the lifetime of a city [24]. In summary, a visual representation of the necessary resources to provide high-quality early learning is displayed in **Figure 1**. In the next section, we will examine the various approaches cities have taken to fund high-quality early education and care in the United States.

2. Cities taking the lead to fund early education and care in the United States

Cities, like states, use the same funding streams to set aside and allocate resources for early childhood, but also have creatively explored other avenues in recent years to increase funding for local initiatives. More than two dozen cities have dedicated, voter-approved funding for early childhood education. Cities generally use one of four types of tax to create sustainable and dedicated funding streams: 1) Income; 2) Property; 3) Sales; or 4) Sin. Income tax approaches vary from an overall income tax on the entire community to a tax only on high income wage earners. Although the use of income tax is viewed as a progressive funding approach, most cities have been reluctant to utilize income tax as a funding mechanism for early learning because income is already heavily taxed by the United States federal government and most

states. Additionally, because the amount of income tax withheld is reported to workers on each paystub, community members consistently see how much of their income goes to taxes, making it harder to garner voter support for increasing the tax. Property tax has been used successfully by cities located where statewide property tax rates are low. Some cities opt to apply the tax to all residential and commercial properties, but more commonly, only to certain types of properties (e.g., commercial or high value residential properties) in an attempt to take a more progressive taxing approach. In spite of its reputation as a regressive tax, local sales tax is one of the most commonly used approaches for funding early education [25, 26].

Sales tax has the advantage of being a less noticeable tax because it is assessed on individual purchases and represents only a small portion of the total price consumers pay. Campaigns to encourage voters to approve the use of sales tax for early learning often emphasize the tax is less than ½ cent. A sales tax that is perceived as more progressive is the sin tax, which increases the price on non-essential items, such as tobacco, alcohol, soda, gambling and gaming, marijuana, and lottery revenue. Sin taxes are popular with cities seeking funding for early education because the tax is viewed as optional. Only those who partake in behaviors like smoking, drinking, and gambling pay the tax. This argument is often persuasive to voters, although in many cities the majority of voters engage in one or more of these behaviors [19, 25, 26].

Considering a city's dedicated funding stream may not generate sufficient funds or may have restrictions on allowable expenditures, cities often supplement tax revenue with private philanthropy or public education funding through school-community partnerships. Community advocacy efforts have helped to shape public opinion on the importance and benefits of high-quality early learning leading to greater local investments for young children and families [19, 25–28]. Cities have worked to combine public and private funds as well as form collaborative partnerships with businesses, philanthropic agencies, and other community organizations to raise additional dollars and obtain resources [19, 29–31]. As a result of many states providing public funding for only some children to attend early education programs, most cities with dedicated early childhood funding have opted to focus on expanding access to more children. **Table 1** offers some examples of city early education programs in the United States.

As displayed in **Table 1**, four of the seven programs serve three-year-old children and all serve four-year-old children. As indicated previously, most programs blend funding across multiple sources with most utilizing local funds through either sales tax, property tax, or beverage tax. Programs demonstrate a variety of mixed delivery mechanisms to serve young children and most use public elementary schools. All programs are full-day and most are offered at no cost to families. Finally, most programs were given a gold quality level demonstrating they served over 30% of children enrolled in preschool programs and met at least 8 of the 10 quality benchmark standards indicated by the National Institute for Early Education and Research. This table highlights programs that were able to obtain creative innovative funding sources that work for their community with high-quality supports [32–38]. We will now showcase a specific comprehensive and innovative funding model in San Antonio, Texas: Pre-K 4 SA.

2.1 A community-based early learning ecosystems approach: Pre-K 4 SA

2.1.1 A bold community-wide early learning vision

Unlike many local early education initiatives across the United States that start by expanding access, San Antonio chose to lead with a strong vision of quality first.

City	Program Name	Ages served	Funding Source(s)	Delivery Mechanism	Program length	Cost to Families	NIEER Quality Level[a]
Boston	Boston Preschool	3–4 years old	State. Local (property tax), and Private Philanthropy Contributions	Public elemenatary schools and community-based organizations	6.5 hours	No cost	Gold
Charlotte	NC Pre-K	4 years old	State	Public elementary schools, private child care programs, and Head Start centers	6.5 hours	No cost	Gold
Nashville	Nashville Pre-K	3–4 years old	State and Local (tax)	Public elementary schools and community-based organizations	6 hours and extended day	No cost or reduced	Gold
New York City	Pre-K For All	4 years old	State	Public elementary schools and community-based organizations	6 hours	No cost	Gold
Philadelphia	Bright Futures Pre-K Counts	3–4 years old	Local (Philadelphia beverage tax)	Public elementary schools and community-based organizations	6 hours	No cost	Silver
San Antonio	Pre-K 4 SA	3–4 years old	Local (sales tax)	Child development centers	7.5 hours and extended day	No cost or reduced	Gold
Tulsa	CAP Tulsa	4 years old	Federal and State	Public elementary schools, charter schools, child development centers, and Educare	9 hours	No cost	N/A[b]

[a]The National Institute for Early Education and Reserach (NIEER) awarded cities three medals: Bronze, Silver, and Gold. A Bronze medal is awarded to cities with over 30% of children enrolled in Pre-K programs; a silver medal is awarded to cities meeting 8 out of 10 quality benchmarks; a Gold medal is awarded to cities with over 30% of children enrolled in Pre-K programs and meeting 8 out of 10 quality benchmarks. The policy benchmarks include: Learning goals, curriculum supports, teacher education level, teacher specialized training, assistant teacher education, professional developlment, maximum class size, teacher-child ratio, health screening and referral, and continuous quality improvement systems. For more information see the full report [19].
[b]Tulsa was not included in the NIEER report and did not receive a quality reference.

Table 1.
Major cities' coordination of funds to achieve high-quality early learning.

In 2011, former San Antonio Mayor Julián Castro convened a taskforce of corporate chief executive officers, superintendents, and education leaders throughout the city to identify the most effective approach to improving community educational outcomes and the resulting workforce trajectory. After a year of study, the Brainpower Taskforce recommended the development of a program focused on high-quality pre-kindergarten services for four-year-old children. The Taskforce based their deliberate decision on the research demonstrating the long-term benefits of improving overall community education outcomes by helping young children to learn and read on grade-level, making them less likely to fall behind their classmates and more likely to graduate and attend college. The Taskforce envisioned a comprehensive program design offering both direct services to children through state-of-the-art early educational centers and increasing access to high-quality opportunities to more families through strategic partnerships and investments in other early learning programs across the city [39].

Championed as a workforce development initiative, the mission of Pre-K 4 SA is to develop a world-class workforce in one generation through high-quality early childhood education. In August 2012, the city council authorized the creation of the San Antonio Early Childhood Education Municipal Development Corporation, in accordance with Chapter 379A of the Texas Local Government Code, known as the Better Jobs Act. The Better Jobs Act incentivizes municipalities to promote economic opportunity by improving the skills and qualifications of the labor force and supporting economic infrastructure. The code articulates the specific approaches a city may employ to improve the workforce, one of which is through the development of early childhood education programs. The Better Jobs Act permits a city to increase the local sales tax to support the Municipal Development Corporation, if such an increase is approved by the majority of voters in a public election. In November 2012, 53% of voters approved raising the local sales tax by 1/8th cent to support the Pre-K 4 SA initiative [40]. The initial authorization was for eight years. In November 2020, Pre-K 4 SA was reauthorized for another eight years with 73% voting in favor of funding the program through 2029 [41]. With a population of 1.5 million, San Antonio is the 7th largest city in the United States. Due to its favorable weather, cultural influences, and historical architecture, San Antonio is also a popular tourist destination. The combination of a large local population, with a strong tourism industry, results in a sizable sales tax revenue. In Fiscal Year 2023, the 1/8th cent sales tax dedicated to Pre-K 4 S A generated over $48 million in revenue for the program [42, 43].

2.1.2 Leading with quality

From the onset, Pre-K 4 SA was designed with quality as the focus. The architects of Pre-K 4 SA, the Brainpower Taskforce, understood that only high-quality early childhood programs generate the types of long-term benefits described in the research literature [11–13, 39]. For this reason, the comprehensive program design includes four state-of-the-art early educational centers that serve as model early learning sites demonstrating what is possible when young children have access to highly skilled and well-compensated teachers, an evidenced-based curriculum, instructional supports and content specific professional learning. The educational centers serve 2,000 three- and four-year olds. Pre-K 4 SA's four education centers are strategically located throughout the city and offer a full-day pre-kindergarten program. All lead teachers are required to have a baccalaureate degree (BA) or a master's degree (MA) in early childhood education. Assistant teachers are required to have a minimum of

a Child Development Associates (CDA) credential. Administrators are required to have a baccalaureate degree in early childhood education and a state-issued principal credential or a child development director credential. Pre-K 4 SA instructional staff engage in over 150 hours of professional learning each year through trainings and job-embedded instructional coaching. Pre-K 4 SA's family engagement team is comprised of parent liaisons from the community and is dedicated to collaborating with families and fostering advocacy opportunities. The family engagement team's goal is to create spaces for families to share ideas and be a part of the decision-making process in their children's educational experience [40, 41, 43–45].

Pre-K 4 SA also offers free best-in-class professional learning for birth through third grade educators and competitive grants for early learning programs across the city. Pre-K 4 SA's professional learning department provides over 10,000 hours of professional learning to over 2,000 birth through third grade educators annually free of charge. The grants department awards approximately $4.2 million annually to partnering early learning programs. Pre-K 4 SA has invested $30 million to enhance and expand early learning programs in partnering school districts, charter schools, private/parochial schools, child development centers, and family home providers. The program's comprehensive structure allows Pre-K 4 SA to create sustainable partnerships with school districts and child development centers to ensure a continuum of care from birth to third grade for children entering and exiting the program. During its first eight years, Pre-K 4 SA supported 13,000 additional young children across the city and impacted more than 138 schools [43].

In 2017 Pre-K 4 SA was awarded the HEB Excellence in Education award and was recognized as being the best early childhood program in Texas. By 2019, all four education centers received National Association of the Education of Young Children (NAEYC) accreditation and the National Institute of Early Education Research (NIEER) awarded Pre-K 4 SA a Gold Medal for meeting all ten of the quality policy benchmarks [19, 43].

2.1.3 Results of Pre-K 4 SA

A series of independent evaluations were included as part of the program design of Pre-K 4 SA. These independent annual evaluations have demonstrated positive results based on the Pre-K 4 SA learning model [40, 41, 44–52]. Together, these evaluations indicate positive results with respect to short- and long-term outcomes for children and families. For example, program findings demonstrate increased classroom quality, kindergarten readiness, attendance, 3rd-grade test scores, and employment and wage earnings for families. Moreover, there has been a decreased need for additional early reading supports, special education placement, and grade retention.

With respect to classroom quality, Pre-K 4 SA classrooms were observed in the spring of each school year using the Classroom Assessment Scoring System (CLASS) [53]. CLASS is an observational system used nationally and internationally and assesses classroom practices in preschool by measuring the interactions between children and adults [5–8, 54, 55]. Scores range from 1 to 7 with values from 1 to 2 indicating low levels of quality, values from 3 to 5 indicating mid-levels of quality, and values from 6 to 7 indicating high quality [53]. Presented in **Figure 2** are the overall CLASS domain averages across years. In 2019/20 observations were not conducted due to the COVID-19 pandemic.

As displayed in **Figure 2**, average scores for the Emotional Support domain ranged from 6.2 to 6.7 (on a 1–7 scale), with all scores in the high range of Emotional Support,

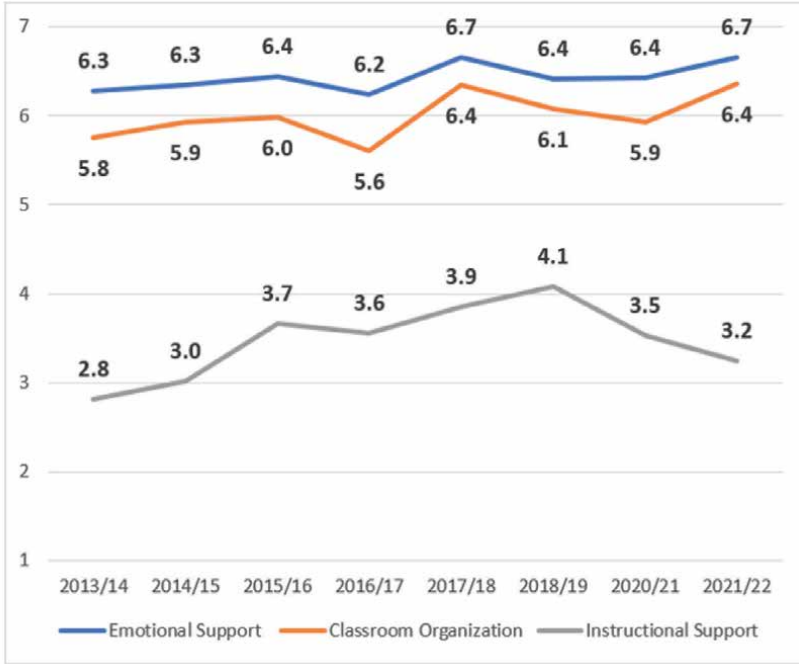

Figure 2.
Average Pre-K 4 SA scores over time demonstrating high-quality learning environment for young children.

suggesting observed teacher-child interactions were consistently rated as high quality over time. Average scores for the Classroom Organization domain scores ranged from 5.6 to 6.4, with scores either near high or in the high range, which suggests classrooms showed effective interactions regarding Classroom Organization. Finally, Instructional Support domain scores ranged from 2.8 to 4.1, with all but the first year in the mid-range, which suggests in some observed interactions teachers provided support that extended children's thinking or asked questions that encouraged children to analyze and reason.

When considering classroom quality, Pre-K 4 SA has consistently achieved high levels of Emotional Support, near high or high levels of Classroom Organization, and mid-levels of Instructional Support. It is important to note that lower ranges of Instructional Support quality are common across the United States and internationally as these types of interactions are found to be especially challenging for teachers of young children [4–9, 54, 55]. As displayed in **Figure 2**, these findings demonstrate observed teacher-child interactions were well organized and managed and consistently supportive to children's safety, security, and well-being. Additionally, teacher-child interactions fostered learning opportunities to support higher order thinking, cognitive development, and instances to hear and use language.

In addition to these findings, an evaluation was conducted to examine the cost and benefits of Pre-K 4 SA [46]. Total costs were calculated using the ingredients method, a conservative method of cost calculation, supported by the Institute of Education Sciences within the United States Department of Education as a rigorous method of cost and benefit calculation [56]. Unlike other methods limited to budgets and expenditures, the ingredients method considers the total costs of implementing a program (including the value of facilities, equipment, and in-kind services). Therefore, it is

expected the ingredients method will result in higher costs compared to other calculation methods.

The total cost of the Pre-K 4 SA program and the average cost per child are shown in **Table 2**. The total cost of providing the Pre-K 4 SA initiative for one year, in 2018 dollars, is $33,454,290, including all four core components (Education Centers, Family Engagement, Professional Development, and Competitive Grants), serving an estimated 21,872 preschool-age children. Dividing this total by the total number of children served by all four components, produces an average cost per child of $1,530.

To examine whether the identified benefits of Pre-K 4 SA exceeded the associated costs, a Benefit-Cost ratio was calculated to analyze how much benefit to the society is generated per dollar of investment in Pre-K 4 SA. Monetary values were calculated for the existing evaluation outcomes (see **Table 3**).

When all monetized evaluation outcome benefits were aggregated, an estimated total societal benefit of the Pre-K 4 SA initiative was estimated at $10,590 per participating child. When considering the local San Antonio community, the benefits were estimated at $3,790 per participating child. This monetary benefit comes primarily from increased parent participation and earnings in the workforce, where parents are afforded more time for their careers while their children are in care.

2.1.4 Expanding birth through five access to high-quality early learning opportunities

As previously mentioned, the vision of Pre-K 4 SA is to support, strengthen, and amplify the work happening within San Antonio's existing early learning ecosystem,

Total cost	**Value**
Aggregate (all components, all resource *type)*	$33,454,290
Per child (unweighted average)	$1,530

Note: Present value cost in 2018 dollars, rounded to the nearest $10. The total number of all children reached by the four components during the 2018–2019 school year was 21,872.

Table 2.
Total cost of Pre-K 4 SA, in aggregate and average cost per-child terms (N = 21,872 children).

Effects (outcomes)	**Monetized Value (per child)**
Improved mathematics test score at grade 3	$1,830
Reduced grade repetition during grades K-3	$200
Reduced special education placement during grades K-3	$650
Increased student attendance during grades K-3	$230
Increased weekly income among Extended Day parents	$7,690[a]
Total	$10,590

Note: Present value cost in 2018 dollars, rounded to the nearest $10. The total sum may not exactly equal the dollar values across all rows in the table due to rounding. [a]The full estimated result for Extended Day participants is $15,800 with salary and non-salary compensation taken into account. However, to appropriately attribute evaluation outcome effects across participants, that value is spread across the total of 1,943 children (rather than the 945 who attended Extended Day), thus arriving at the value included in the Benefit–Cost ratio of $7,690.

Table 3.
Estimated benefits per child demonstrating the monetary value of Pre-K 4 SA.

especially toward expanding access to high-quality birth through three-year old programs. In 2019, Pre-K 4 SA partnered with seventeen child development centers to develop a San Antonio Shared Services Alliance to improve the quality of child care and increase access to more families in vulnerable areas of the city experiencing child care deserts. The Alliance grew in 2022 to include fifty-seven child development centers and twenty-three family home providers. The Shared Services approach focuses on sharing skilled staff and resources to provide business and pedagogical leadership among a network of center and home-based providers [57].

The San Antonio Shared Services Alliance offers partner providers professional learning, business leadership development, marketing and communications, teacher credentialing, and program certification and accreditation support. Pre-K 4 SA serves as the Alliance hub agency, while providers work within the network in peer-to-peer support groups to share information and resources. The Alliance has fostered a sense of community among providers who often work in isolation, and also leverages economies of scale to negotiate contracts and services that benefit all Alliance members. This has resulted in providers acquiring research-based curriculums and curriculum supports, classroom materials and furniture, outdoor learning equipment, and shared operational services, such as landscaping and building maintenance. The Alliance has also provided support for recruiting, supporting, and retaining high-quality educators and staff. These supports include job-embedded coaching, job fairs, and a substitute teacher pool for when educators are not able to work. Other cities and communities across the United States have also implemented a variety of Shared Services models in order to better leverage funding opportunities and resource sharing through early learning program partnerships.

2.1.5 Sustainability through community partnerships and awareness

San Antonio has a long history of addressing issues of early childhood through public policy and philanthropy. This commitment, engagement, and support, along with the broader community and civic leader awareness, are keys to the launch and continued success of Pre-K 4 SA. The ability to capitalize upon the work the city was already doing in the early learning and care space, while also leveraging the political will of the mayor and other cross-sector community leaders (i.e., education, philanthropy and business) helped to strategically align critical stakeholders in moving forward with an ambitious early education agenda.

A targeted communications strategy, along with building and maintaining community support, is a focus of Pre-K 4 SA. During the first years of the program, efforts were focused on educating the community on the benefits of early childhood education, generating awareness of the newly launched program, and driving enrollment. Initially, Pre-K 4 SA had a marketing plan, but not a strategic communications plan. The central focus of the marketing plan aimed to ensure families enrolled in the program. However, a 2016 community survey revealed most community members had little to no awareness about Pre-K 4 SA. Most concerning, some community members assumed the program had failed because they had not heard about it since the authorization election. The research indicated significant and community-wide need to elevate the conversation from Pre-K 4 SA's programmatic components, to the program's benefits for children, families, and the community [40, 41, 43–52]. As a result of the research evidence and knowing the program would be seeking reauthorization, Pre-K 4 SA hired a communications professional to lead brand development and strategic communications. The communications manager hired a team that

reported directly to executive leadership with a dedicated budget capable of sustaining year-round, paid and non-paid, multi-stream messaging to multiple stakeholders. This decision was central to securing overwhelming voter support when the program went up for reauthorization.

Pre-K 4 SA has also adopted a consumer-focused and consumer-driven communications approach. The program has identified three priority audiences for public education and communication: 1) families; 2) educators; and 3) the broader community. Efforts include dedicated media messaging for each target audience. Further, marketing events and outreach connect media efforts to real-world engagement in the communities where families live and work. As Pre-K 4 SA continues to expand its reach beyond its early education centers, communication efforts are shifting to educate the public about the program's city-wide impact on the larger early learning ecosystem through its partnerships with other programs. This strategy aids efforts to build and sustain community and leadership support by focusing on the program's goals, benefits, and return on investment.

2.2 Strategies to fund and implement quality supports: A discussion

While Pre-K 4 SA is a powerful example of a community securing and leveraging public funding to increase access to high-quality early learning, the program exists in a unique context with situational factors that do not exist in every community. Nonetheless, we believe there are important lessons from Pre-K 4 SA's approach and the work of cities across the United States that can inform early childhood advocates in locations globally. This section offers some strategies for funding and developing high-quality early learning models in different contexts and environments:

- **Quality first**: The first and most important lesson is to focus on quality before access. Some might argue that getting more children into early learning should be the primary goal as early learning of any quality is better than no early learning. However, this approach can lead to low-quality programs with mediocre results and no lasting impacts for children and families [4–9, 54, 55]. The case of Pre-K 4 SA demonstrates that when families and the community have visible examples of what high-quality early learning looks like, they are better positioned to advocate for higher quality programs. In this way, demonstration sites serve as "models" to guide providers and the community toward higher quality standards and families toward higher quality programs. Pre-K 4 SA had the benefit of funding to build four model preschools. This worked for San Antonio, but it is not the only way. Communities can identify or develop high quality providers to serve as demonstration sites. They can conduct site visits to high-quality programs in other communities. The essential aspect is to have a shared vision of high-quality early learning and a community commitment to work toward it.

- **Multi-sector support and partnerships**: In the United States, early education has not had strong political champions. Political leaders tend to have little knowledge about early education and its deep research base [4–20]. As a result, early education does not tend to rise to the top of policymaker agendas. When it does, it is generally positioned as a necessary part of getting more people (mostly women) into the workforce. Similarly, business leaders often fail to understand how critical early learning is to the development of the current and future workforce. Even educational leaders lack understanding about early learning

and its relevance to long-term educational outcomes. San Antonio addressed this issue head on by ensuring the Brainpower Taskforce was comprised of prominent business, civic, and educational leaders. This strategic decision resulted in a strong multi-sector coalition united around a common goal: to develop a high-quality early childhood program to serve children and families across the San Antonio community [39]. Cross-sector collaborative partnerships are important because each stakeholder group can leverage their expertise independently and collectively. Political representatives can advocate for a need in their local community. Business and financial experts can use their connections and resources to secure funding. Education leaders can use their pedagogical and early childhood content expertise to train and develop staff needed to provide quality educational experiences to children and their families. The convergence of multi-sector partnerships can lead to stronger support for early learning initiatives, as well as additional community funding and resources.

- **Independent evaluations**: An external annual evaluation was included as part of the program design of Pre-K 4 SA. External evaluations are important because they allow for actionable feedback to determine what aspects of a program are working well, what aspects can benefit from further refinement, and if there are any outstanding needs. Moreover, the evaluation plan can be adapted over time to service the needs of the program and the community. For example, the Pre-K 4 SA evaluations included outcomes associated with kindergarten readiness, classroom quality, longitudinal program effects, benefit–cost analyses, and the economic benefits families receive from participating in the program [40, 41, 44–52]. Therefore, external evaluation findings can add more credibility and be used to demonstrate the potential value of a program and its effectiveness. Program evaluations also provide the community with access to information about the need for high-quality early learning experiences for children and families.

- **Community awareness**: Early learning programs directly serve a relatively small segment of the larger community. If families who are directly served by the program are the only community members who know the benefits of the program, securing ongoing funding will be a challenge. An effective strategic communications plan ensures widespread understanding that early learning benefits the entire community.

3. Conclusions

Ensuring all children have access to high-quality early education leading to lifelong learning opportunities and long-term benefits is a noteworthy goal of global importance [1]. This chapter highlighted the significance of high-quality early childhood education and its associated benefits, while calling attention to the difficulties in obtaining adequate funding due to limited public investments at the federal and state level in the United States. Due to inadequate funding, many programs lack the necessary resources to provide quality benchmarks and instructional supports, which are crucial for young children to attain the lasting benefits of preschool [18]. Therefore, to provide opportunities for more children to engage in high-quality early learning environments, greater investments are needed.

Consequently, cities and local communities are taking the lead in thinking innovatively about how to secure financial resources for providing high-quality early educational experiences to young children prior to formal schooling [19, 25, 26, 58]. To further expound on how city led programs are funded and operated, the chapter showcased a comprehensive community-based program in San Antonio, Texas: Pre-K 4 SA. The case for Pre-K 4 SA demonstrates a cross-sector perspective to leveraging funds based on local community resources and creating long lasting impacts for its citizens [39–52]. The chapter also provides strategies to foster inspiration on pathways in which early education and care can be funded and implemented with high-quality in local contexts and communities across the globe. Cities know their community's needs and are best positioned to create multi-sector integrated partnerships that collectively work toward providing equitable access to sustainable, high-quality early care and education.

Conflict of interest

The authors declare no conflict of interest.

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Chapter 8

South African-Based Childhood Obesity Prevention Programme

Suzan Mokone, Mashudu Manafe and Lindiwe Ncube

Abstract

Childhood obesity is a public health problem associated with high risk of onset of non-communicable diseases in the adult years. Preschool is a crucial phase in the development and growth of physical, social, and mental well-being. Thus, a South African childhood obesity prevention program was developed to promote healthy eating behavior in young children aged two to five years. The programme is aimed at caregivers and mothers of preschool children. This programme is multi-faceted and focuses on basic principles of healthy eating, such as increasing the consumption of fruits and vegetables, as well as strengthening physical activity in preschool environments. Healthy family environments are essential to the growth and development of children, and they should include healthy family meals and physical activities.

Keywords: preschool, children, obesity, healthy eating, nutrition

1. Introduction

More than 42 million children under the age of five are overweight or obese around the world, 35 million of whom live in low- or middle-income countries [1]. Obesity is on the rise worldwide and has been ranked as the fifth leading cause of death among children [2]. Consequently, the World Health Organization (WHO) identified childhood obesity as one of the highest priorities. The United Nations Children's Fund (UNICEF) estimates that 3 million children under the age of five die every year in the world from malnutrition, and the cost of treating malnutrition is estimated at $3.5 trillion annually [3]. Childhood obesity is a public health problem that involves the high risk of non-communicable diseases (NCDs) that affect people's physical, mental and health status [1]. In the United States, children under five years of age in Latin America had the highest weight and obesity prevalence (40%), followed by Australian children with an obesity prevalence of 28 per cent, which put them at high risk of metabolic syndrome [4, 5]. The 2013–2020 World Health Organization's World Action Plan for the Prevention and Control of Childhood Obesity is a global priority, and recommendations have been made to countries to prevent childhood obesity [1]. WHO recommends that countries should encourage that processed, nutrient-poor foods and beverages be reduced in favor of healthier alternatives and promote physical activity to prevent childhood obesity [6].

2. Dietary intake of preschool children

Children under five years of age, who consume high-energy sugary foods and live a sedentary lifestyle, are more likely to develop type 2 diabetes and cardiovascular disease in early childhood, and this is associated with higher likelihood of disability and premature death [7]. Energy-rich, nutrient-poor, high-sugar, high-salt snacks, and sugar-sweetened beverages (SSBs) contribute to childhood obesity [5, 8]. Preschool children eat high-fat, high-fat energy-dense foods such as fries, crisps, bread, and processed foods [7]. In addition, some studies show that most children around the world eat a large amount of energy-intensive foods, saturated fats from animals, which increases the risk of overweight and obesity [9, 10]. Intake of fatty foods with high trans fats and saturated fats, high energy density foods, is associated with childhood obesity [11]. Moreover, diets high in trans fatty acids were found to increase risk of obesity and cardiovascular disease by 27% [12].

High-protein diets such as fatty lamb, beef, and fried chicken are a risk factor for childhood obesity, as high protein content stimulates insulin-releasing amino acids, resulting in weight gain and obesity [13, 14]. Most working parents and those who do not have time to cook at home buy fast foods, which are convenient and affordable, but high in calories, with unhealthy fats, sugars, salt [12].

In rural and urban areas in North West province, South Africa, the consumption of sugar and sweet beverages (SSBs) is increased among children under five years of age, thus increasing the risk of childhood obesity [15, 16]. Increased consumption of SSB leads to an increase in calories, which in turn leads to weight gain and causes children to become overweight and obese [17]. High intake of sugar beverages among children from low-income households may be related to low prices and this becomes a risk factor for childhood obesity [12]. High-sugar drinks are less filling than food and can be consumed in greater quantities, increasing the calorie intake. According to a 2014 Economic Research report, the average daily consumption of calories in the United States has increased by 459 over the past 40 years [18].

Most overweight children have been reported to eat snacks between meals, especially pastries, and few children consumed healthy snacks, such as fruit or nuts [17]. Large portions lead to high calories and a 30% increase in energy was noted when children were offered large portion sizes [18]. In addition, a study conducted in the United States showed that less children had smaller portion of food and most children ate larger portions [19]. WHO recommends that preschoolers consume a smaller proportion of nutritious food which has lower energy density as an important strategy for prevention and management of childhood obesity (**Table 1**) [6].

Food group	Recommended cooked portion size	Portions/day
Starches	Mealie meal/maltabella/Oats porridges-: 125–250 ml Samp/pap: 250–300 g Rice:65 g Potatoes:80 g Sweet potatoes: 80 g Pasta: 200–300 g Bread: 2 slices	1 cup starchy porridge 60–80 g potatoes/ 200 g pasta/ 2 slices bread

Food group	Recommended cooked portion size	Portions/day
Proteins	Mince: 50–100 g Beef/chicken/lamb/pork/fish: 60 g Soya:80 g Cheese: 30 g Egg: 30 g	50–60 g protein dish/ 30 g cheese/1 egg
Dairy	Milk: 250 ml Maas: 250 ml Yoghurt:250 ml t	1–2 cups milk Or 1 cup milk & 250 ml yoghurt
Fruits & vegetables	Cooked vegetables:150–200 g Salads (e.g., cucumbers/tomatoes): 60 g Fruits: 2–3 medium fruits Fruit juice: ½ cup	150-200 g vegetables/60 g salad 1 fruit/1/2 cup fruit juice
Fats	Oil: 1tsp Margarine: 1tsp	1tsp oil 1tsp margarine

Table 1.
Recommended food group portion sizes for children 2-5 years of age (Source: [6]).

3. Physical activities of preschool-age children

Children with excessive weight are less likely to exercise as they are exposed to the risk of being ridiculed by other children and thus spend most of their time watching television and eating fatty snacks [20–22]. Children who regularly exercise are less likely to develop NCDs such as type 2 diabetes and heart diseases [23].

The prevalence of obesity and obesity is rising in South Africa, causing burdens such as type 2 diabetes, asthma, liver fatty disease, cardiovascular disease, high cholesterol, sleep disorders, insulin intolerance and insulin resistance [24]. According to a study conducted by Hayes et al. [25] in Sydney, Australia, hospitalization, and medical expenditure for obese children was higher. The global obesity costs accounted for 2–7% of annual medical costs, and in the USA, the cost of treating obesity-related diseases, particularly diabetes, imposed pressure on health services, accounting for 26% of medical costs [26]. A study in Cape Town found that 13 percent of children admitted to the Red Cross War Memorial Hospital were obese and suffer from chronic diseases such as diabetes, hypertension, and heart disease [27]. Despite the Department of Social Development's efforts to provide menus for implementing adequate nutritional meals in ECDs, it was found that the food offered to pre-schoolers was mainly starchy, with little animal products and little fruit and vegetables. Inadequate pre-school menus can lead to high consumption of saturated fats, sugars, and low fibers, and can put children at risk of becoming obese [27, 28].

The National Health and Nutrition survey in South Africa showed a 13 per cent obesity rate among children aged one to five, twice the global average of 6.1 per cent [29, 30]. Despite efforts at national level, childhood obesity remains a problem in children aged 3 to 9, with the highest prevalence of obesity in Gauteng province [31]. Quality of care, including adequate food supply and participation in physical activities in preschools, has an impact on the growth and development of social, intellectual, physical, and psychological characteristics of preschool children. Consequently, it is necessary to develop and implement a pre-school obesity prevention intervention. Instigating healthy lifestyle programs in pre-schools contributes to the introduction of healthy diets and improvement of the quality of life. In South Africa, there

are currently no specific programmes to prevent obesity among children aged two to five. The current obesity strategy in South Africa targets all age groups, however, the prevalence of obesity and obesity in children is increasing. The developed programme includes a healthy lifestyle strategy for children, preschools, and families.

4. South African-based childhood obesity prevention programme (SABCOPP) for preschool children

SABCOPP is a multi-component program (**Figure 1**) that was developed based on children's nutritional status (before and after interventions) and nutritional knowledge (before and after interventions) and food preparation practices of the caregivers [32]. ECDs are ideal for preventing childhood obesity because children's eating habits between the ages of two and five can be influenced by the size of the portions and food types served in ECDs and in a home setting. Sustainable Development Goal 3 (SDG 3) calls for the promotion of strategies to improve the health and quality of life of infants and young children [24]. Consequently, the SABCOPP framework has been developed to prevent childhood obesity in children aged two to five by improving the nutritional knowledge and food practice of ECD caregivers and mothers. The SABCOPP framework proposes three strategies for preventing obesity in children attending ECD.

4.1 Pre-school setting

Children spend 28 to 40 hours a week and consume three quarters of their daily nutritional needs at a preschool, therefore, pre-schools become an important environment to promote healthy lifestyles including eating healthy foods and exercising [31]. The pre-school caregivers prepare food for children and impact their nutritional conditions, laying the foundations for accurate knowledge of healthy food, positive attitudes to food, and a healthy lifestyle [24]. Preschools should provide nutritious meals to children to promote their health and physical well-being.

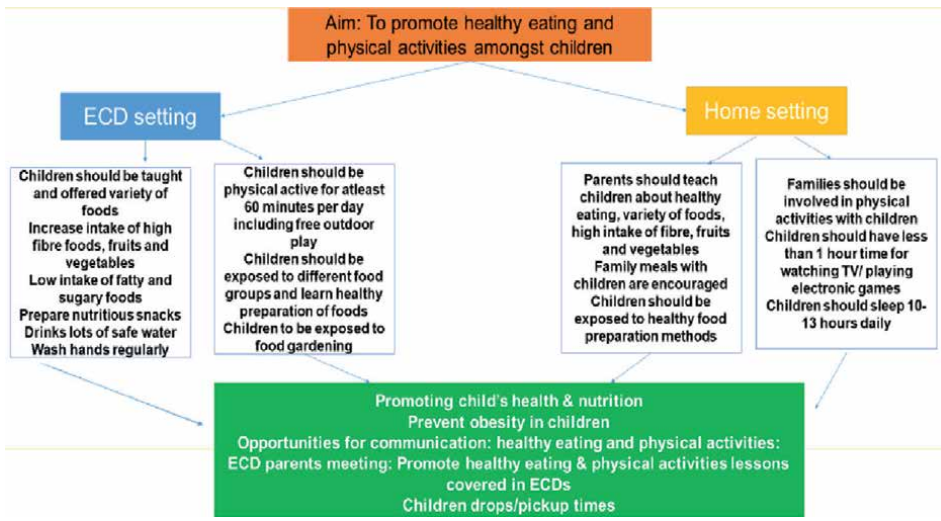

Figure 1.
South African based childhood obesity prevention programme for children 2–5 years.

Addressing overweight and obesity among children below the age of 5 years is very important for the prevention of NCDs [33].

4.2 Healthy eating

Preschool children's caregivers should provide nutritious meals, beverages, and snacks to children and a variety of foods (**Figure 2**). Five servings of fruits and vegetables should be consumed daily as they are high in fiber, low in energy, and helps with satiety [34]. Most meals should include starch foods, such as refined maize, samp (starch from dried corn) and brown bread. Lean meat and lean chickens, fish and eggs should be eaten daily. Dry beans, split beans, lentils, and fiber-rich soybeans should be consumed regularly. Children should be given clean and safe water to drink from a cup daily [35].

4.2.1 Practical tips for healthy eating

Children should be fed meals five times a day, including a greater variety of foods from all food groups.

Include at least one serving of food from each of the four key food groups each day.

Include one serving of liver, fish, chicken, meat, or eggs every day.

Use at least one vegetable or fruit rich in vitamin A such as dark green leafy vegetables, orange fleshed vegetables, and fruits.

Use dry beans, split peas, or lentils as an ingredient in meals or as a side dish.

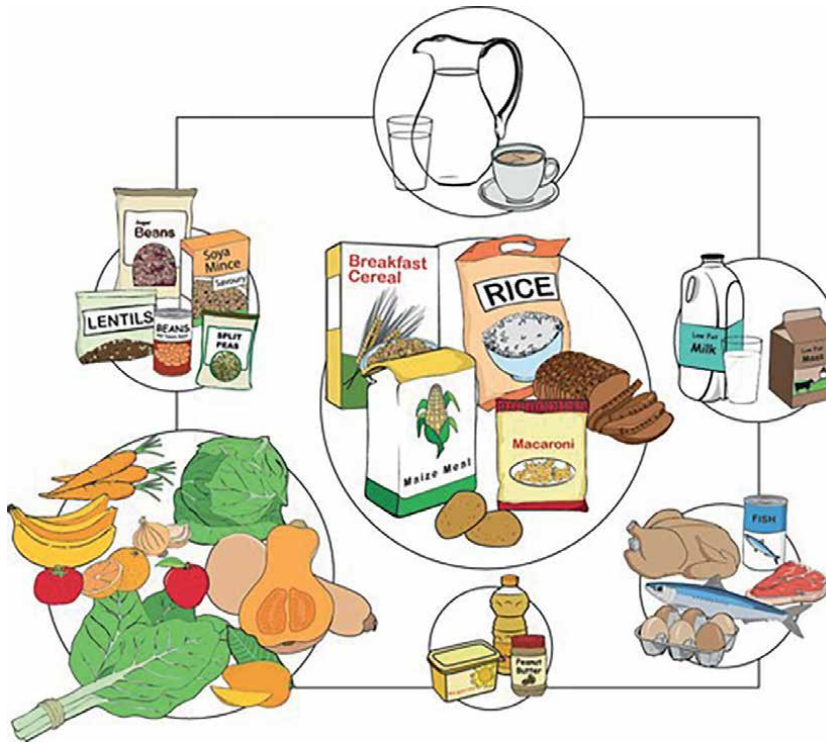

Figure 2.
Variety of foods for children according to the food based dietary guidelines for south Africans. Source: [15].

Foods that are not recommended are as follows:

- Instant porridges or cereals are high in sugar and salt.
- Children should avoid low-nutrient foods such as cakes, biscuits, sweets, and chips.
- Processed meat products such as Polon, vienna, grilled fish, chicken nuggets, beef patties or sausages may be avoided as they are high in fats, preservatives, and salt.
- Milk from a cow or goat that has not been boiled, pasteurized, or heat-treated should be avoided.
- Sweetened yoghurt and some drinking milk contain a lot of sugar.
- Tea and coffee creamers, condensed milk or milk mixtures should be avoided because they do not provide important nutrients (proteins, calcium, riboflavins) or do not contain much of any nutrients.
- Cold drinks, juices, and squash are rich in sugar Frequent consumption of fruit juice can cause tooth decay, especially during meals. Children may not get enough fiber from food when they drink juice instead of fruit. Beverages may obstruct their appetite and they do not eat enough food during meals.
- Children should avoid foods that are high in fat content, sugar, and salt (**Figure 3**).
- In the preparation of food for children, high-salt ingredients/seasonings such as stock cubes must not be used [24, 35].

4.3 Nutrition education for preschool children

- Children should learn about healthy eating and balanced eating, including various food groups.
- Fresh foods are energy-rich and protein-rich foods, enabling bodybuilding.
- Vitamins and minerals such as fruits and vegetables help prevent infection and strengthen the immune system.
- Eat various foods by combining different groups of foods to make food healthy, including healthy snacks.
- Five small meals a day (children have a small stomach and cannot eat enough for a long time).
- Children should avoid drinking sugary beverages, rather than drinking a lot of water. Choose healthy fats and oils and avoid saturated fatty foods.

Figure 3.
High-saturated foods that should be avoided.

4.3.1 Portion sizes

Children should smaller portions of nutritious foods as an important strategy for preventing and managing child obesity [6]. Smaller plates and bowls should be used in order to control the portion size of a food item (**Figure 4**).

Children should eat a healthy breakfast to provide nutrients for mental growth and development [36]. Eating a healthy breakfast in pre-school will induce a good breakfast behavior, which will be lasting even during adulthood. Children should be offered a taste of foods to let them try new fruits and vegetables they may not have tried before. (e.g., kiwi, blackberries, broccoli, cauliflower, etc.).

Figure 4.
Examples of small plates recommended for children.

4.3.2 Healthy snacks

Children should eat healthy snacks, such as fruits and vegetables, and avoid high-energy, fat, and trans-fat snacks. Energy-rich desserts, chips, cakes, cakes, cakes and sweets should be avoided.

4.3.3 Food preparation methods

Cooked foods and raw foods such as fish, meat and chicken should be separated to avoid cross-contamination. Food must be cooked and stored well [6].

4.3.4 Hygiene and sanitation

Hand washing with soap and clean water before cooking or eating is necessary.

The surfaces and types of equipment used in food preparation should be regularly cleaned and protected against insects, pests, and other animals.

Food and kitchen equipment clean to prevent infection.

Raw and raw food should be separated to avoid cross-contamination.

Cooked food should not stay at room temperature for more than two hours, but should be served hot, and the leftover food should be covered and stored at room temperature [24].

4.3.5 Physical activities

Children should be given the opportunity to increase their physical activity by becoming more active. Children should exercise for one hour a day to develop motor and physical abilities, promote healthy lifestyles, and prevent obesity [37, 38]. Physical activity increases ECD energy expenditure and fitness. One hour of exercise a day, including dance, soccer, netball, walking and dancing. During the rainy season, caregivers should provide classroom physical activities and inexpensive equipment (jump ropes, hoops, balls, etc.) in local shops, but encourage physical activities outside as much as possible and include free games.

4.4 Food gardening

Children should be taught and observe how to grow food in food gardens, which will increase awareness and promote the consumption of vegetables and fruits [36].

5. Family factors

Families play an important role in the way children eat in a household. Children should be taught about the health effects of obesity. Families should be aware of the importance of healthy food and role of physical activities for children.

5.1 Healthy family eating

Children should eat a variety of foods to provide nutrients needed by the body such as carbohydrates, protein, as well as vegetables and fruits. High-fiber foods such as lentils and beans should be included in children's diet. Children should consume five portions of fruits and vegetables a day to protect them from childhood diseases [37]. Limit the intake of sugar and sugar-sweetened beverages and fruit juice to 1/2 glass per day. Water should be the beverage of choice for children. Parents should put as much time aside for family meals as possible and provide nutritious food to children. Eating family meals regularly together is encouraged because it provides an opportunity for children to learn about healthy food. Families have a role to play in shaping and guiding children towards healthy food and the importance of physical activities [37]. Family meals are a way of teaching children the benefits of healthy eating, and children should be encouraged to try different foods to learn different textures and tastes, and to experience different foods from different food groups. The portion size of the food items given to children should be controlled. A good snack to give to your child includes fresh fruits, cooked vegetables, low-fat yoghurt, or milk. Children should not be exposed to food served in restaurants as they are energy dense. Children should be encouraged to participate in the preparation of healthy meals, they should be taught to sit with other family members during mealtimes, and not be distracted by watching TV or playing games during meals.

5.2 Physical activities

Parents should engage their children in physical activities, as different music and movements help children build fitness and increase their energy utilization at home. Physical activities improve gross motor skills and promote self-confidence and self-confidence [38]. According to the 24-hour movement guideline in South Africa, children should exercise at least 60 minutes a day [39]. Regular physical activity will improve health and weight management in the short and long term [40–43]. Encourage children to play indigenous activities such as running, football, and most importantly, take a walk with your children (**Figure 5**).

Active parental participation includes repeated participation in workshops, advice or education sessions; passive participation (such as reading brochures or newsletters) does not involve parent or guardian.

Figure 5.
Promoting physical activities among children.

5.3 Routine sleeping for children

Children should sleep 10 to 13 hours a day, which will help them recover energy. Sufficient sleep promotes good health and the development of children's nervous system. Parents must ensure that their children sleep for sufficient time [39].

5.4 Children's screen time

According to the 24-hour movement guidelines in South Africa, children should watch television less than one hour a day because longer-term television encourages children to consume high-energy snacks such as chips, pizzas, and sugary beverages [39]. Parents should limit children's time viewing television, playing computer games, and watching films to 30 minutes or less each day [44].

5.5 Hygiene and sanitation

To prevent infection, keep food and kitchen utensils clean. Always wash your hands and children's hands with soap and water before eating, and after using the toilet.

6. Discussion

Preschool nutrition intervention can promote healthy eating and the adoption of healthy lifestyles. Preventing childhood obesity reduces health care costs and economic burdens by preventing chronic diseases later in life and improving the overall quality of life [26]. Caregivers with good nutrition knowledge contribute to healthy eating for their children [36]. Improvements in caregiver nutrition knowledge and good food preparation practices promote healthy weight for children [36, 45]. Physical activities such as outdoor and indoor play are very important for children

because they promote the maintenance of healthy weight [42]. UNICEF's nutrition conceptual framework states that caregivers play an important role in promoting healthy diet and participation in physical activity among children. Nutrition education is essential to improve children's nutrition and nutrient status and promote healthy growth and development [36]. Parents at home are the model of healthy behavior, so it is important for parents to be educated about healthy foods and the benefits of physical activity so that they can teach their children. Family meals and physical activities in the family are important opportunities to educate children on healthy behavior [42, 43, 46].

7. Conclusion

SABCOPP, a developed programme incorporates the basic principles of healthy eating with emphasis on high consumption of fruits and vegetables and increased physical activity. The programme emphasizes the family component as it influences eating and general lifestyle behavior of a child.

Acknowledgements

The authors thank the preschools' caregivers and mothers of the preschools who participated in the study. The opinions and views expressed in this chapter are those of the authors.

Conflict of interest

There is no conflict of interest in writing this chapter.

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Chapter 9

It All Adds Up: Connecting Home and School through Family Math

Jessica Mercer Young and Kristen E. Reed

Abstract

Considered a core component of children's foundational cognitive development, early mathematics experiences can support children's long-term academic success. Teachers and families alike share the common goal of wanting children to succeed developmentally, socially, and academically. Given the importance of early mathematics to academic success in all subjects, children need and deserve to build a robust knowledge of early math concepts in their earliest years. In this chapter, we consider the approach of the Young Mathematicians (YM) project at EDC, which for the past ten years, has partnered with families, teachers, and early childhood programs in richly diverse communities with large populations of students of color, linguistically minoritized students, and students living in poverty, to support math learning across home and school environments. We illustrate some of our fun early learning games that engage teachers and families alike and are freely available in multiple languages for anyone to use. We discuss how our close collaboration with families and teachers has informed our approach to equity and report on some of the positive results from our research. Finally, we reflect on ways we can all improve how we are partnering with families and teachers to create equitable and supportive learning communities.

Keywords: math, games, equity, family engagement, learning community, families, teachers, family math, mathematics education, growth mindset, early math

1. Introduction

Opportunities to engage in early math learning is an equity issue with lasting consequences, as math learning *before* kindergarten entry strongly impacts and predicts future success in school [1]. All children deserve to be inspired by math and to reach their full potential, but for many, differences in math knowledge are evident at kindergarten entry, favoring children who have greater access to economic resources [2, 3]. This results in persistent educational learning gaps, as children who start kindergarten behind in mathematics may struggle to catch up to their peers [3, 4]. Addressing this challenge requires investing in early childhood programs and supporting families as education partners [5] as early intervention with preschoolers could help to narrow this gap and have important longer-term implications [6].

All children, no matter where they live, should have what they need to learn and develop well. Some children are born into communities where resources are

abundant, but others may not be. In our work, we prioritize the communities that are under-resourced, so all families have the information they need to launch their children on a path to success. When children have opportunities to engage in meaningful mathematical interactions it can support their cognitive development and foster the skills and behaviors they need to engage in learning, such as problem-solving, puzzling, and persevering. The very skills they will need to successfully navigate life and work in the twenty-first century.

1.1 Importance of math learning

Early mathematics knowledge is considered a critical component of young children's foundational cognitive skills [7] and the early years provide a pivotal opportunity to tap into children's curiosity and motivation to learn from interactions that are enriched with mathematics [8–10]. Accumulating research evidence indicates that children's early math knowledge predicts their future academic outcomes and success in school, [1, 11–13], on high stakes standards-based math tests in middle school [14], and through high school [15]. Importantly, early math skills predict later literacy skills [16] and are an even stronger predictor of later outcomes than early reading skills [1]. In fact, supporting kindergarteners' early mathematics skills builds a foundation not only for advanced mathematical knowledge but also for achievement in reading [17] and science and engineering [13, 18]. Indeed, knowing how to bolster children's mathematics learning at home and in classroom settings, through games and other developmentally appropriate activities, is of great interest to families, educators, early childhood leaders, and policymakers [19].

1.2 Development of early math knowledge

From the time they are born, children are intrinsically mathematical [20], naturally engaging in mathematical ways of thinking in the areas of number, geometry, measurement, early algebraic reasoning, and data analysis [21, 22]. Developing early mathematical competencies is a complex process that begins well before children enter kindergarten [22] and children need adult support to build and extend their math knowledge [23]. Early childhood teachers and parents[1] alike typically recognize verbal counting as an important mathematical skill that is related to later school success [24], but it is mastery of the specific counting principles that is critical to laying the foundation for broader mathematical thinking. For instance, when counting a set of objects, children need to (a) tag one object with one count word without skipping or double counting (one-to-one correspondence), (b) be able to recite number words in the correct order, and (c) know that the last word reached when counting a set represents the whole set (cardinal principle) [25] and children need opportunities to engage in challenging counting activities to develop their understanding of the principles that underlie meaningful counting [26]. Although these principles may seem intuitive to adults, the cardinal principle is a major milestone for preschoolers that leads to new numerical competencies [27, 28] but developing that skill often requires support from both parents and teachers. Given the long-term positive impact that

[1] For the sake of brevity, we sometimes use the word *parent* to refer to children's primary caregivers, but we recognize families come in many configurations, and the primary caregivers may be grandparents, aunts, uncles, older siblings, other family members, or guardians.

early math knowledge has on children's future academic success [1], children need and deserve to build their knowledge of math concepts in their early years.

1.3 Math talk to support children's learning

Unfortunately, differences are evident in preschoolers' understanding of number and early math concepts [6], which has a cascading effect, as these differences in children's math knowledge predict their math achievement through the elementary school years [12, 29]. A potential explanation for these differences in children's math knowledge is the variability that children experience in their learning environments both at home [30–32] and in preschool classrooms [33]. To build and extend early foundational math skills, children need lots of opportunities to engage in mathematical thinking, in playful ways, that is supported by contingent discussion and "math talk" that allows time for children to think [34]. This is critical as children's mathematical language emerges early, and family engagement in math talk during the early years supports growth in their math skills [35]. Indeed, accumulating evidence suggests that the amount of math talk children experience at home [29] and in preschool [36] and the content of the math talk [37] are correlated with later math skills in elementary school. For instance, young children's number knowledge is related to the amount of family math talk about numbers, starting when children are toddlers [29, 38]. Math talk about key early math concepts such as cardinality [39], spatial reasoning [37, 40, 41], and talking to preschoolers about advanced number concepts [42] have all been shown to predict children's advanced number skills.

1.4 Families and teachers need support in early math

Children also learn more math when they experience more math interactions at home [30, 43, 44] and in the classroom [45, 46]. Yet many families, including highly educated ones, report that they do not feel confident in their ability to support their child's math learning [47]. A growing body of evidence suggests that when parents interact around mathematics and provide their children with more mathematics-related activities and talk, children have higher mathematics outcomes regardless of their family's level of income or education [2, 29, 30, 48, 49]. However, families often do not have access to the types of early math experiences that are developmentally appropriate for preschool children [30, 50] and lack access to the network of supports, resources, and knowledge that are necessary to foster early math development effectively [2]. Importantly, families have highlighted their child's teacher as a key resource that could provide them with more information on what they can do to support their child's math learning [47]. Teachers could provide that bridge for families, which is critically important, as parent-child activities that go beyond counting, such as comparing amounts of items and adding or subtracting objects, can help children acquire more advanced mathematics knowledge [51].

However, early childhood teachers also find it challenging to translate developmentally appropriate teaching strategies into challenging math activities [52–54]. Even in the classroom, preschool teachers often limit their instruction to basic aspects of numbers and counting, and perhaps shapes [55], and spend more time on math concepts that may not be sufficiently challenging [56]. In fact, relatively little time is spent on math learning activities in preschool classrooms at all [33] even though preschoolers who experience more math-related interactions in the classroom and are exposed to more math activities, have higher math achievement [33, 57]. Indeed,

variations in preschool instruction [58] and kindergarten instruction [59] are related to children's math learning. In particular, the percentage of time teachers actively engage children in math, build upon their mathematical ideas, and facilitate children's responses predict gains in their math knowledge [60]. This underscores the need for teachers to understand children's mathematical thinking and use this knowledge not only to guide their teaching [61] but also to support families doing math at home.

2. Young Mathematicians

To enhance opportunities for all children, regardless of background, children need to be provided with learning opportunities that meet their diverse needs [62], and teachers and families need specific tasks to help them see and understand children's mathematical thinking, along with the support and resources to use this information. To address this need, we created the Young Mathematicians (YM) program at EDC, which has partnered with families and early childhood programs to support mathematics learning across home and school environments. YM is grounded in Bronfenbrenner's (1986) Ecological Systems theory [63, 64], which posits that children simultaneously grow and develop within different ecosystems, from the most intimate family and home ecological system, moving outward to the larger school system, and then to the most expansive syst'em: society and culture. Each system inevitably interacts with and influences each other in every aspect of the child's life. Young Mathematicians aim to capitalize on the interconnectedness of children's environments, infusing each level of the ecosystem with positive attitudes toward mathematics and opportunities for children to engage with high-quality early mathematics practices. For the past ten years, we have been working with teachers and families from Head Start[2] programs in richly diverse communities with large populations of students of color, linguistically minoritized students, and students living in poverty. Together with these communities, we developed over 55 mathematics games for young children to play at home, at school, or during family play and learning events.

The YM family engagement approach to supporting family math is built on empirical evidence that suggests four important parameters are key for family math interventions to successfully support children's mathematics learning. The first is that a particularly powerful strategy for promoting children's school readiness skills (regardless of content strand), is for schools to provide families with information about the kinds of activities they can do at home that complement children's school-based learning [57, 65]. The second is that family math interventions need to provide parents with concrete examples of the mathematics that preschoolers can learn through these daily activities and should illustrate the similarities between early mathematics and language [66]. The third parameter is that families who have a better understanding of early mathematical development may implement more mathematics activities, and therefore family math interventions should focus on developing families' knowledge of young children's mathematical thinking [2]. Finally, early

[2] The federal government funds Head Start programs through the U.S. Department of Health and Human Services, Administration for Children and Families. Eligible participants include 3–5 year old children whose families meet the HHS Poverty Guidelines. Based on the 2023 poverty guidelines [https://aspe.hhs.gov/topics/poverty-economic-mobility/poverty-guidelines], a family of 4 will be eligible for Head Start if their income is at or below $30,000.

mathematics interventions should take adults' attitudes toward mathematics into consideration as math anxiety can dampen children's mathematics outcomes [67].

Building on these principles, YM uses games and problem-solving activities (math minibooks) to support young children's foundational mathematics development. YM helps the adults in children's lives to overcome negative feelings about math by offering ideas for how mathematics can be infused into their lives in easy, fun, and playful ways. The materials also provide resources that families can use to expose their children to mathematics-related activities that promote number talk through games, activities, minibooks, and text messages with everyday math ideas. Notably, YM's family engagement approach to family math has helped to underscore for educators the importance of engaging families to support children's learning. Teachers have worked hard to discover new ways of engaging families in early math learning opportunities and in the words of one Head Start teacher who participated in YM:

> *We know children's learning begins in the home, families are fundamental in shaping children's interest and skills in math. So, in my opinion we can give families ingredients, and motivation to support their young children's mathematical development effectively. Families can also support children's math development by providing environments that are rich in learning. Families can teach children to see and name small quantities, count, add, subtract, and point out shapes.*

2.1 Why games?

In order to meet the needs of both families and teachers, we took the approach of designing and testing math games that could be played at home and at school. Math games provide a "hook" for teachers and families—playing a game is more interactive, fun, and developmentally appropriate than, for example, pulling out a worksheet. Play and other informal activities are important contexts in which children develop interests in mathematics, develop their skills, and extend conceptual understanding [45]. Adults can enhance children's exploration and learning through guided play—co-playing with children, asking open-ended questions, and exploring materials with them [68]. Math games can therefore promote adult–child co-play with mathematical ideas and foster more math talk in families and in the classroom [68, 69]. When adults and children interact around board games, mazes, and connect-the-dots activities, this helps to promote children's mathematics learning [10, 30, 51]. Games also provide playful learning opportunities that are fun, yet challenging [70] balancing difficulty and skill level, thus fostering motivation and engagement among young children [71]. Additionally, gameplay can promote self-regulation skills through following rules and taking turns, while also offering opportunities for children to practice their skills in communication, empathy, and conflict resolution [71].

For parents, particularly those who may be intimidated by the prospect of "doing math" or simply are not familiar with early math learning and development [47], the game context is also more approachable, as many families welcome incorporating games as part of their family routines and see games as a natural way to play and interact together. The game context can also support adults to engage in mathematics in playful ways, as many adults have had negative experiences with mathematics and may feel some math anxiety that leads them to avoid math. These feelings about math may be barriers to mathematics engagement in the home and may even negatively affect their children's mathematics achievement [72, 73]. Math games can provide families with specific concrete examples of the type of mathematics activities that are

developmentally appropriate and fun, which is something that parents say that they want [30, 74] suggesting that a potentially powerful intervention for engaging both teachers and families in mathematics is for children to participate in playful, engaging, and developmentally appropriate mathematics games at home and at school.

Indeed, in our research, we found that adding a family math component to a game-based classroom intervention resulted in positive impacts on preschoolers' mathematics knowledge and was an effective low-threshold intervention that helped to foster early math competencies [57]. For example, some of our games include games with cards and dice. Dice games encourage children to systematically repeat simple counting and adding procedures [75] and card games provide information about number symbols and number words [76] and magnitude comparison [77, 78]. Engaging with children in game-based learning also provides opportunities for adults to observe children's choices and strategies and then provide children with feedback about specific mathematics concepts. The structure of games also helps to support adult caregivers in co-playing while implementing developmentally appropriate instructional strategies. Games are also a fun and developmentally appropriate alternative to the worksheets or flashcards that many caregivers may turn to when they are unsure how to best support children's math learning.

2.2 YM math games

Together with the Head Start teachers, families, family engagement specialists, librarians, and other educators and partners over the past ten years, we developed over 55 mathematics games for young children to play at home, at school, or during family play and learn events. Resources and instructions in English, Spanish, and Portuguese, including videos and written documentation, are freely available on www.ym.edc.org. The written directions and videos explain how to engage children in the math games and introduce the mathematics concepts that are addressed by each game. The directions encourage players to adapt the games and modify them to their liking. Below we describe two of the games that specifically focus on developing children's knowledge of number.

2.2.1 Numbers, Numbers, 1, 2, 3

A favorite game for families and teachers to play is *Numbers, Numbers, 1, 2, 3* because all you need to play with are the fingers on your hands. In this game, children practice counting, knowing how many in all (cardinality), seeing how many immediately (subitizing), and composing and decomposing numbers (see Video 1 in Video Materials). The adult starts by holding their hands behind their back and chanting, "Numbers, numbers, one, two, three, how many fingers do you see?" The adult might show three fingers (one on one hand and two on the other hand). Children might know right away that there are three fingers or they might need to count the fingers—one, two, three. Or they might start counting at "1" but then start over again on the second hand counting "1, 2". The adult can then help them count across both hands "1, 2, 3." Once children figure out how many, you can play again. Children catch onto this game very quickly and typically want to take over being the one showing the fingers on their hands. As children gain more practice, adults can challenge them with numbers up to ten. And later, they can borrow a friend's hands and make numbers up to 20. For a video of how to play the game and an overview of the math for Numbers, Numbers, 1,2,3 go to: https://go.edc.org/Numbers123 (see also Video 1 in Video Materials) [79].

2.2.2 Roll Two: a game with cards and dice

The game *Roll Two* is a developmentally appropriate variation on the game *Shut the Box*, which is rumored to have origins dating back hundreds of years as a popular pub game in England. Our version is appropriate for preschoolers and families and uses two regular six-sided dice and 13 cards printed with numerals 0–12 with the corresponding dice pattern underneath (see **Figure 1**).

Children start by putting a set of cards in order from 1 to 12 (a more challenging variation is 0 to 12, less challenging variations are 1 to 6 or 1 to 3). Adults can learn what children know by watching them arrange the cards: *Do they put them in order from left to right? Do they recognize the numerals and know the order they go in? Do they count the dots on the cards to check which has more and which has fewer? Do they immediately leave a space between four and six to place the five card*. By simply setting up the game, adults learn what children know about numeral recognition, subitizing, and creating a number path. Then, children roll two dice and can turn over cards that match either: one of the rolled numbers; both rolled numbers; or the sum of the two rolled numbers (see **Figure 2**). The goal is to turn over all of the cards. Children can play alone or play against another player to see who can turn over all their cards first. (See also Video 2 in Video Materials for an overview of the math and instructions on how to play the game Roll 2 or go to: https://go.edc.org/Roll2) [80].

While this seems like a simple game, there is a lot of math and a lot of strategy involved. For example, say a child rolls a 3 and a 2. First, they are practicing recognizing dots on the die (subitizing) and connecting that quantity of dots to the numerals 3 and 2 on the cards. They are also practicing combining (or adding) 3 and 2 to make 5. Children may have to count 1, 2, 3, 4, 5 one-by-one to know that these together make 5 or they may be able to recognize 3 and 2 immediately on the dice and be able to count on from

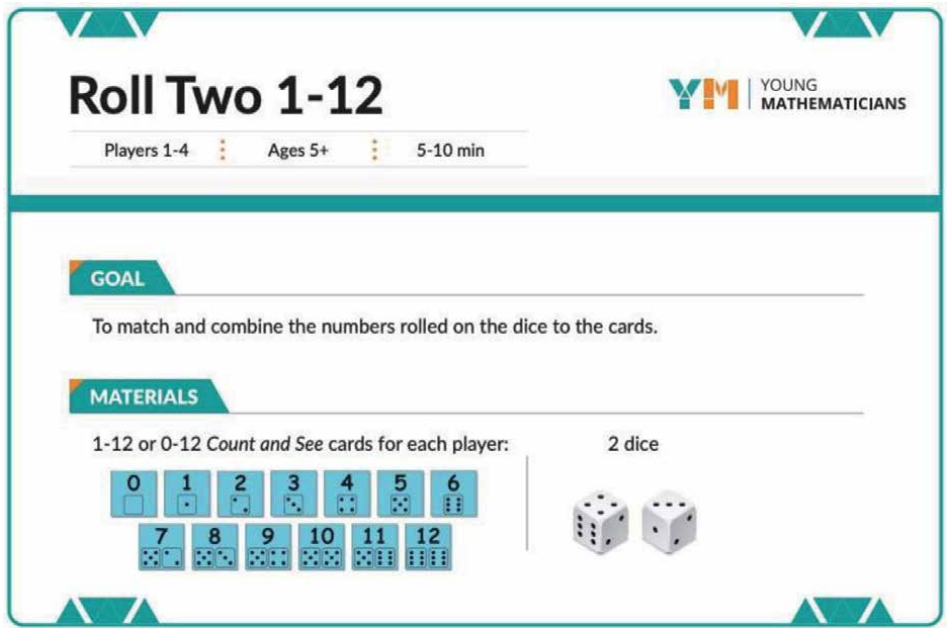

Figure 1.
Materials for Roll Two 1–12.

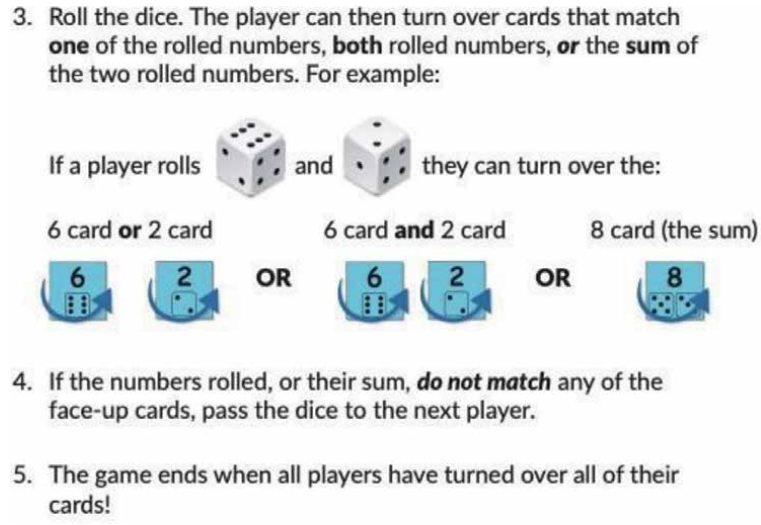

Figure 2.
Roll Two directions.

3—saying 3, 4, 5. With practice, children will be able to quickly add 3 and 2 in their heads and know 5. When playing this game, there are natural opportunities for adults to support children's learning such as encouraging them to use using the counting on strategy. As children gain more practice, they can add a rule that they are also allowed to subtract their roll—if they roll doubles, such as a 4 and a 4—they can subtract 4 from 4 and turn over their 0 card. When introducing subtraction in this game, we always like to add the caveat that children might venture into negative numbers—and that's okay! It can be tempting for adults to say that you cannot take away a bigger number from a smaller number—that you cannot take away 5 from 2—but, of course, you can. It is negative 3. In our materials, we encourage adults not to try to explain negative numbers to preschoolers but also not give children the misconception that it is not possible to subtract a bigger number from a smaller number. We suggest that adults acknowledge that you can take away 5 from 2 and that it will give you a negative number—negative numbers are very interesting and something children will learn about when they are older.

3. Young Mathematicians program of research

The Young Mathematicians (YM) program began in 2013 with a study to explore how math games could promote mathematics learning and persistence for preschool children attending Head Start programs. After successfully developing and testing a set of seven math games with over thirty classrooms in three Head Start programs and hearing from teachers that who wished families had access to these games, we expanded the work in 2015 by adding a family math component. The new intervention included both a classroom math and a family math component.

3.1 Adding family math to the equation

To build evidence for the importance of including a family math component in a classroom mathematics intervention, we evaluated two preschool math intervention

conditions and their effects on child outcomes, relative to a practice-as-usual condition: a classroom math (CM) intervention and a classroom math plus family math (CM + FM) intervention (for more details see [57]). Using math games has been key to our approach for creating inclusive classroom and family math practices and thus, the classroom math intervention included math games and playful instructional materials, and a relatively light touch professional development (PD) course for Head Start teachers. The family math (CM + FM) intervention included the same classroom math PD and games but added family math games and resources (such as bilingual math minibooks) that teachers could send home with children. Both conditions were "ecologically valid" such that they were implemented under naturalistic conditions, implemented by the teacher with the whole class, and aimed to support more than one mathematics skill.

We conducted a clustered randomized control trial with 573 children from 66 classrooms in three Head Start programs across two states in the Northeastern United States and found that in mixed-age (3- to 5-years) Head Start classrooms, the classroom plus family math intervention was significantly associated with spring mathematics scores relative to practice as usual (effect size of d = .20) but the classroom math intervention (without the family math component) was not significantly associated with outcomes. This finding underscores the value of combining a family-engagement component with a classroom mathematics intervention and adds to the evidence of the key role that family engagement plays in promoting children's math learning. In addition, this finding suggests that the combined intervention (CM + FM) has potential as an effective means to fill a gap in early childhood instructional practice especially because it can be implemented at scale without substantial investments in a specific mathematics curriculum, PD, or coaching support. In fact, interventions that can be qualified as "ecologically valid" are limited, and knowing under which conditions these interventions can be considered effective is essential [81].

YM's family math component provides children with two touchpoints for the mathematics—within the classroom, and at home—thus allowing the child to become the expert who "teaches" their parent how to play the games they learned at school. Parents report that seeing their children competent and confident about math is a great source of pride. As part of our family math community partnership work, we have expanded upon these touchpoints by adding more places within the community for families and children to encounter positive experiences engaging with mathematics ideas.

Highlights from our findings showed that

- For older preschoolers, 50 months and up, a classroom math plus family math intervention had a significant positive impact on children's mathematics learning compared to practice-as-usual classrooms (effect size of .36).

- The number of math games played (regardless of intervention condition) was significantly associated with higher mathematics scores.

- The classroom plus family math intervention had a significant positive impact on teachers' *instructional support* as measured by the CLASS preK [82] (effect size of .79)

3.2 Forming a family math learning community

Based on the success of adding a family math component to the YM classroom intervention, in 2019, we received funding to create a family math learning community

in Worcester, Massachusetts. Worcester is a unique and richly diverse city and holds the triple distinction of being the second largest city in New England, a leading Gateway City, and the leading refugee resettlement community, with a decades-long history of welcoming refugees from around the world. This project was one of two Family Math Roadmap Implementation Project Learning Community Grants funded for two years (2019–2021) by the Heising-Simons Foundation and the Overdeck Family Foundation (for more details see [83]). This family math learning community focused on scaling up the implementation of the YM classroom and family math program, adding culturally relevant resources, and promoting sustainability by coordinating across Head Start, the public library, a family partnership program, and the pre-service teacher program at the local community college to ultimately close the opportunity gap in early mathematics. In partnership with these community organizations, we aimed to align young children's learning experiences across the community and establish a "web of opportunity" by linking home, school, and the broader community, and promoting positive attitudes toward math. A key goal of the family math learning community has been to increase access and equity in early mathematics learning by putting families first and promoting the belief that math is for everyone.

Our approach to forming a cohesive family math community has been to codesign with educators and families the math games, resources, professional development, and supports that can be used in different contexts across the community—at home with different age siblings, at library story times, during family playgroups, and in preschool classrooms. A particular goal of the family math community work has also been to engage Emergent Multilingual Learners (EMLs) and to support children and families who have historically been denied access and equitable opportunities to engage with high-quality math experiences. While there is strong evidence that connecting home and school environments can reap great learning benefits for children and their families, there is still a question as to what models work for whom and under what circumstances [81] and whether such models can be scaled to broaden access to more families. In an effort to illuminate the practices and benefits of a community-wide approach to family math, we conducted an external evaluation of the YM family math learning community.

3.2.1 External evaluation of family math learning community

The external evaluation of this family math learning community found that the partnership among the community-based organizations promoted an increased understanding of the importance of early math for families, with families showing an increased interest in, and knowledge of, early math. Families also increased in how comfortable they felt helping their children with early math while feeling that they had also improved in their ability to come up with fun math activities to do with their children. The partnership also promoted an increased understanding of the importance of math for educators, with educators showing an increased interest in early math. In addition, educators were more comfortable engaging young children in early math activities in the classroom. In some cases, educators' beliefs about early math improved, for instance, educators grew in their understanding that everyone can learn math and that young children are curious about math ideas. Educators also felt more comfortable supporting family math; they increased their confidence to help parents understand children's age-appropriate math skills and were more confident answering families' questions about early math activities. In addition, educators reported that they were more confident about knowing the best ways to share math

information with families and were more confident about how to connect families to resources that support children's math development. Finally, educators were more confident about knowing the best practices and having the right tools for engaging families in early math.

Together with our community partners, we have bolstered support and awareness of the importance of early math, provided professional development to early childhood educators, and connected with families to share information, support, and materials that complement what their children's educators are learning in professional development sessions. We continue to sustain and expand this work with a current grant from Heising-Simons.

In the 2022–2023 school year, we expanded the mathematics content addressed in the program and tested the YM classroom and family math intervention in over 30 classrooms in three additional Head Start programs. Analyses for this study are underway.

4. Learnings from the YM codesign process: developing family math resources with families and educators

As part of YM, we have been able to work in close collaboration with early childhood educators and families with young children. The goal has been to support teachers' instructional practice, teachers' family engagement around math, and families' math play at home. Together we have codesigned many additional games and the supports and resources that accompany them. For example, during professional learning sessions with educators and family math workshops with families, we debriefed which aspects of the family math program were working and which aspects could be improved. We brainstormed design changes together, then we modified the materials and brought these revised materials back to get feedback on the new versions. This process has been transformative in creating our current family math resources. These are some of the principles that were most important.

4.1 Games need to be adaptable to children of different ages

Children in Head Start classrooms range in age from 2.9 to almost six years old. Likewise, families have siblings of different ages. Families and teachers found that the games they played the most were the ones that they could play with children of different ages. In *Numbers, Numbers, 1, 2, 3*, adults could play with just one, two, or three fingers for younger children (ages two- or three-year-olds), but go up to 10 or even 20 with older children. Likewise, with *Roll Two*, children could play a variation with just one die and numbers one to six when they are younger. This meant that when the younger children ask, C*an I play too?*, parents and teachers were able to say, *Yes!*, and adapt the game so they were also successful.

4.2 Easy to access written game directions

Both families and teachers asked for home versions of classroom math games. Teachers asked for games they could easily send home to families, and families asked for fun games to play and incorporate into their family time. In addition, families and teachers asked for the games to be accompanied by easy-to-follow instructions in multiple languages. We redesigned our original instruction sheets to be visual with

images and icons to make them easier to follow and written with an informal voice and everyday language to reinforce the idea that the games are fun and easy to use.

4.3 Video directions

Going beyond written directions, teachers and families thought to create short game direction videos that can be watched on a mobile device and easily shared with friends and family. These "how to play" videos could quickly and easily illustrate the game rules and key math concepts the games addressed. We created these videos so that you only see the gameplay so that they can easily be voiced over or subtitled in different languages to increase their accessibility.

4.4 Math minibooks

We had initially prototyped math minibooks that were bilingual in English and Spanish on each page. These eight-page, easy-to-read books were printed in black and white and could be easily printed and assembled at home or by teachers to be sent home with children. The minibooks were designed to complement the math games and give families a fun way to help their children deepen their learning by reading the books together and practicing the math concepts at home. Families told us how much they liked having English and Spanish on the same page and this also helped teachers who could send the same resources home to families whose home language was either Spanish or English. While this was valued by teachers and families, they also asked for additional versions that included more languages. We worked to add Portuguese and Arabic to these resources.

4.5 Families want to learn about young children's mathematical development

At first, we thought that families would not want to learn as much about children's mathematical development as teachers need to know. But we were wrong. The families who participated in our studies were clear that they wanted to know about the research in early mathematics and children's learning trajectories. Therefore, all of the written and video game directions include information about the mathematics children are learning, including common misconceptions and ways to extend their learning.

4.6 Math lens

Teachers and families emphasized that the games were a launching point for them to begin to see the world through a math lens and to develop that math lens in their children. Teachers and families alike reported that children not only asked to play the YM math games, but they also began creating their own math games.

5. Creating equitable and supportive mathematics learning communities

When we approach our work with educators and families, we begin by honoring adults' mathematical identities, acknowledging math anxiety and the history of exclusion in mathematics, then focusing on the assets adults bring to creating positive identities for the children in their lives. Beginning our work this way is critical

for creating a positive math community because so many adults carry the baggage of negative experiences with mathematics. If we seek to interrupt this cycle for the next generation of learners, we must first address it with the adults who are their role models and teachers.

5.1 Mathematical identity: *how did you experience math as a young learner*?

We often begin our workshops with adults with a four-corners activity using these picture books: *The Little Engine That Could* by Watty Piper [84]*; Oh, the Thinks You Can Think!* by Dr. Suess [85]*; Alexander and the Terrible, Horrible, No Good, Very Bad Day* by Judith Viorst [86]*;* and *Know and Follow Rules* by Cheri J. Meiners [87] (see **Figure 3**). We ask them to reflect on their experiences as a young math learner and pick the book they most identify with. In each group, many adults identify with the book, *Alexander and the Terrible, Horrible, No Good, Very Bad Day*. Some will describe the stress of having to solve 50 multiplication problems in one minute and feeling inadequate every time they did not make it to the end or made a mistake somewhere on their paper. Others will describe playing *Around the World* and the pit in their stomach every time it was their turn to answer a question for their team. Fortunately, many (and often the same people) will have had positive experiences where they identify with the book *The Little Engine that Could*, and remember math teachers that believed in them, inspired them to keep trying, and stuck with them until they figured it out. Some people will identify with the book, *Oh the Thinks You Can Think*, and explain that they saw math as a puzzle and loved the feeling of figuring out how to solve the different puzzles and challenges. We believe that honoring adults' experiences as math learners is a critical place to start this work because we know that parents' and teachers' feelings about math, and particularly math anxiety, can be passed on to children [67, 72, 88, 89]. We discuss as a group how we can interrupt that cycle of math anxiety so that they can provide their children and the children they work with positive experiences.

Figure 3.
Four corners activity.

5.2 Inclusive mathematics

We recognize that math education has an unjust history routed in institutional systems of oppression that have led to differences in learning opportunities and outcomes based on race, class, culture, language, and gender. Historically, mathematics, and particularly algebra, has been used as a gatekeeper that determines who is qualified for higher education and who is not [90]. Many adults hold the belief that some people are math people and other people are not. One of the ways we try to disrupt this conception is by doing open-ended mathematics together. For example, we often start a session by noticing the math we see in a photograph or a picture book. In this illustration (**Figure 4**), people often notice things like: two forks, two cups, six groups of three blueberries on toothpicks, the clock shows 6 o'clock, one red train car and three blue train cars, and many more mathematical ideas. By looking in picture books for mathematics, participants gain practice in noticing the math all around them and seeing how they are using math every day.

5.3 Mathematical assets

The mathematical knowledge and experiences that children and their families bring have historically not been valued in school mathematics classrooms [92]. Yet, we know that there is rich mathematics happening at home and in communities [93], even though it may be implicit and harder to recognize [94]. In our work with educators and families, we begin to unpack the many ways we use mathematics in our daily lives and uncover how we can leverage these experiences to support children's learning. Families and educators asked for easy and accessible ways to incorporate math into their daily

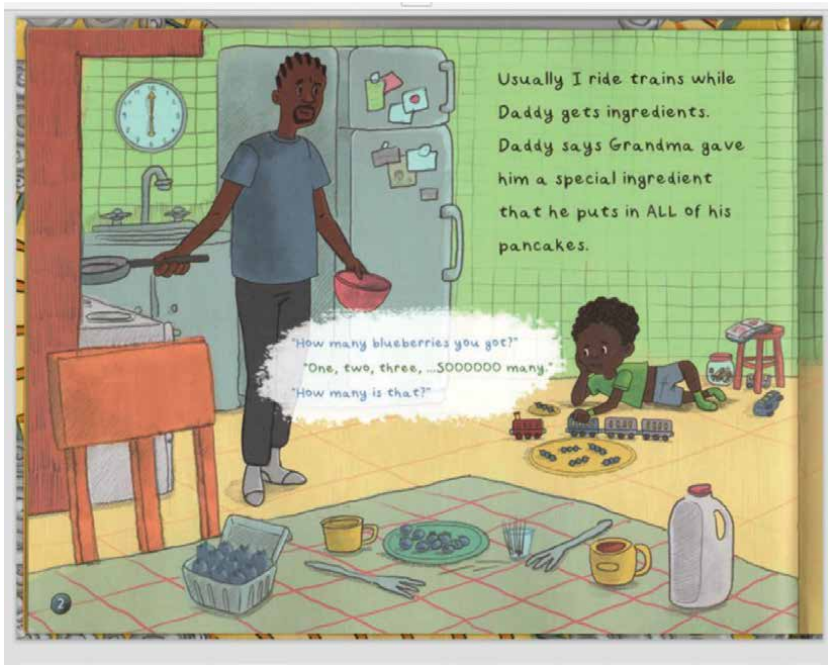

Figure 4.
Page from Sometimes We Do, written by Omowale Moses [91] and illustrated by Diego Chaves.

activities and conversations. Families were often surprised by how easy this could be and how much math could be found in their regular routines. Capitalizing on this, we identified common routines that families could "mathematize" easily, such as counting plates and forks while setting the table, sorting laundry, and comparing and contrasting the size and shape of common objects. By pointing out the math concepts embedded in these routines, families said that they suddenly "saw the math all around them."

5.4 Families and teachers as partners

A key component of creating an equitable learning community is for families and teachers to see each other as equal partners who are committed to helping children succeed developmentally, socially, and academically. Unfortunately, during our sessions, we address the core beliefs about family engagement and look for ways to create effective and respectful partnerships between families and teachers [95].

5.5 Improving family partnerships

Educators and families alike share the goal of wanting children to succeed developmentally, socially, and academically. However, to support family engagement, and especially for a family math learning community to be successful, stakeholders must find the right mix of strategies that will empower and engage families, while being sustainable for schools and other community educators. Everyone involved should be committed to continuous improvement and to adapting and revising plans while keeping a clear focus on the overall mission. By engaging young children with developmentally appropriate mathematics experiences and providing family math opportunities, teachers and educators can support families to build a firm foundation for their children's later academic success and contribute to addressing inequity in children's long-term educational outcomes.

6. Conclusion

In this chapter, we have described the Young Mathematicians program, which is designed to create a more equitable start for young children by supporting mathematics learning across home and school environments. We take a socioecological view of children's development and see the whole community—all the places where children and families live, learn, and play—as part of an opportunity web that supports children's learning. In close collaboration with educators and families, we have created over 55 freely available mathematics games for young children to play at home, at school, or during family play and learn events. By design, these games are accessible and engaging to a wide range of ages so that everyone who wants to play together—siblings of all ages, caregivers, and grandparents—has a way to join in.

In our work, we seek to ensure that all families, particularly those from historically underserved communities, have the resources and tools they need to create opportunities for their children to engage in meaningful early mathematics experiences. We know that educators and families alike share the common goal of wanting children to succeed and that for a family math learning community to be successful stakeholders must find the right mix of strategies that will empower and engage families while being sustainable for schools and other community educators. The YM approach seeks to provide tools and resources that can help all families with young children have the

information and support they need to give their children rich and developmentally appropriate early math opportunities.

Acknowledgements

The authors would like to acknowledge several colleagues and advisors who were instrumental in the success of this work: Heidi Rosenberg, Deborah Schifter, Deborah Spencer, Paul Goldenberg, Louisa Anastasopoulos, Lindsay Clements, Lori Coletti, Luz Maria Considine, Eric Dearing, Kim Foster, Jim Galdos, Janna Kook, Kelley O'Carroll, Laura O'Dwyer, Shakesha Thompson, Nora van Wassenaer, Donna Dervishian, and Kim Foster. Thank you to the teachers and caregivers who helped codevelop and test these games with particular thanks to Worcester Family Partnership, Worcester Child Development Head Start, Worcester Family Math Leaders, Greater Lawrence Community Action Council, Waltham Creative Start, Self-Help, Inc., Southern New Hampshire Head Start, and Holyoke-Chicopee-Springfield Head Start. Special appreciation to the Young Mathematicians in Worcester partners board members: Carlene Sherbourne, Karen Waters, Elizabeth Vietze, Greg Mullaney, Shemekia Pearson, Esther Hope-Sowah, and Colleen Manning.

This work was supported by the National Science Foundation (DUE 1348564 and DRL 1907904), the Heising-Simons Foundation (Grants #2015-023, 2016-13, 2019-1396, 2021-2871, 2022-3381) and Overdeck Family Foundation (Grant #2019-1396). Any opinions, findings, and conclusions or recommendations expressed in this paper are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Author note

For the sake of brevity, we sometimes use the word parent to refer to children's primary caregivers, but we recognize families come in many configurations, and the primary caregivers may be grandparents, aunts, uncles, older siblings, other family members, or guardians.

Video materials

Video 1: Numbers, numbers, 1,2,3

For an overview of the math and video instructions of how to play the game see: https://go.edc.org/Numbers123 (follow the link for videos in Spanish, English, and Portuguese) [79].

Video 2: Roll two

For an overview of the math and video instructions of how to play the card game Roll 2 see: https://go.edc.org/Roll2 (follow the link for videos in Spanish, English, and Portuguese) [80].

It All Adds Up: Connecting Home and School through Family Math
DOI: http://dx.doi.org/10.5772/intechopen.112714

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Chapter 10

A Childcare Social Enterprise: The London Early Years Foundation (LEYF) Model

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Abstract

This chapter explores the work of London Early Years Foundation, the largest childcare social enterprise in the UK and how it is led with its social purpose at the heart. It recounts the rationale for developing the model which is framed within the three pillars of sustainability the first of which ensure nursery places are provided to children from disadvantaged background using a cross-subsidy fee business model. The importance of a social pedagogy is highlighted to ensure the organisation delivers its social purpose at every level of delivery and do so to build cultural and social capital.

Keywords: early childhood education and care, disadvantaged children, social enterprise, social pedagogy, sustainability

1. Introduction

Our first five years profoundly shape our future life outcomes. Early Childhood Education and Care (ECEC) has the potential to transform children's lives, especially those from disadvantaged backgrounds. The early years are acknowledged as crucial for children's outcomes; the poorest of whom will start school already 11 months behind their more affluent peers. Attendance at high quality early years provision offers a vital opportunity to narrow a gap that will only widen as the school years advance [1]. Education for children in their early years provides significant benefits in determining life chances and increasing social mobility.

Longitudinal studies show that participation in high-quality ECEC programmes has a long-lasting impact on educational outcomes and attainment, as well as on their overall social, emotional, and physical development; and overall well-being. This would imply that society should take greater care of its children because generally what is good for the child is good for society and that extends even further when applied to the most vulnerable and disadvantaged children. ECEC, described in national policy as childcare is also considered a means of supporting parents' access training, employment and social networks, which in turn improve the quality of their children's lives and reduce the risks of child poverty [2, 3]. These benefits are even stronger for disadvantaged children, and those living in poverty [4, 5]. Studies in the US show that high-quality early learning can be especially beneficial for children with a migrant background, particularly those who speak a minority language at home.

However, investment in early years' education and childcare will only benefit children if the provision is of good quality [6].

Despite the research about the benefits of Early Childhood Education and Care for children, the UK Government has not had a formal strategy since 2007 and relied on the market to provide most early education services. The consequence of the mixed market is that children from disadvantaged backgrounds and communities have seen their access to good quality ECEC limited either because there are fewer settings available, the quality is poor, or the fees are too high [7, 8]. This struck me as very unfair and the reliance on the market to solve the problem of access to high quality services appeared to entrench poverty through the very system. Observing this it seemed absurd to continue with the same approach given the benefits to the whole of society of supporting all children but especially those living in poverty. Left unaddressed, poverty can alter the trajectory of a child's entire life increasing the likelihood of long-term poverty, poor educational outcomes, developing obesity, mental health issues as well as dying early. Poverty is the strongest statistical predictor of how well a child will achieve at school. At the end of primary school, pupils living in poverty are often over nine months behind their peers in reading, writing and math's. For example, in the UK, children with a high persistence of poverty, those children on free school meals for over 80 per cent of their time at school have a learning gap of 22.7 months – twice that of children with a low persistence of poverty (those on free schools' meals for less than 20 per cent of their time at school), who have a learning gap of 11.3 months [9]. If poverty is to be reduced or eliminated, the next generation must be our focus.

Shocked by this, I was determined to show that we could do things differently and I designed the London Early Years Foundation (LEYF), to be a social enterprise with a business model that would ensure that children from poor and disadvantaged backgrounds could access high-quality ECEC. The organisation would be shaped by a strong pedagogy with cultural and social capital weaving through its very core. Community engagement would underpin our work and we would provide local employment opportunities, staff and parent training, apprenticeships and local business partnerships in order to drive the widest possible social impact. The organisation would be underpinned by the 3 pillars of sustainability: economic prosperity social equity and environmental integrity economic, social and environmental, also described as the triple bottom line; people, profit and planet and our strategy would be shaped by the 17 Sustainable Development Goals (SDGs) agreed by the United Nations (2015).

LEYF would offer a high quality, ambitious service using a hybrid business model, blending the power of market exchange with the best of commercial business rigour and efficiency and government innovation to create a business that would be centred by its social purpose to provide the best-in-class nursery provision that could support all children including over one third of the children from disadvantaged backgrounds. I wanted to demonstrate that social and commercial goals could be blended together in the pursuit of a fairer society. Ultimately, I wanted to show that providing high quality nurseries could address one element of the poverty that remained a significant determinant of a child's future.

There was limited research about such a model in childcare but there were discussions about social enterprises in a range of other sectors wishing to provide alternative business models that could drive change, raise the standards of achievement and increase economic sustainability. To be successful, the LEYF model needed to be scalable and replicable so that many more childcare social enterprises could be created

particularly as in increasingly complex societies social exclusion becomes resistant to simple solutions like fiscal measures and standardised services [10]. It gave me confidence to believe that I could create an independent, sustainable and equitable method of delivering childcare to challenge the existing two-tier system, in essence state or private settings and shine a light on what might be done differently. This was also a decision taken at a time where children from poor backgrounds tended to be in the depleting number of state-funded or voluntary-run subsidised services, while there was a corresponding increase in private nurseries, often funded through private equity and investment and situated in affluent areas using higher fees to fund the investment. When I began, the system seemed intractable but social entrepreneurs share the view that most problems can be reshaped into a model for change through the hard work needed to confront the societal structures that leave too many behind [11].

Fifteen years on, the task of creating an independent and sustainable social-enterprise childcare model should not be underestimated but given the unfairness of the situation facing so many children, I was inspired by the words of the social entrepreneur Mohamed Yunus who reminded us that indifference is the enemy and if it matters to you then do something about it or as President Obama said in his campaign speeches in 2010, if not now, when [12].

2. Challenges getting established

Building a social enterprise begins with the governance structure which includes leadership. This can be difficult as there is no legal definition of a social enterprise in the UK. Businesses and organisations which describe themselves as such all operate under the 'third sector', an umbrella term which refers, but not exclusively, to charities, Community Interest Companies (CIC), cooperatives and mutuals, fair-trade organisations and social firms. The Department of Trade and Industry describes social enterprises as a business with primarily social objectives where surpluses are principally reinvested for that purpose in the business or in the community, rather than being driven by the need to maximise profit for shareholders and owners. The membership organisation for social enterprises in the UK describes social enterprises as businesses which trade for a social or environmental purpose. There are more than 100,000 social enterprises in the UK, contributing £60 billion to the economy and employing around two million people. Social enterprises demonstrate a better way to do business, one that prioritises benefit to people and planet and use the majority of any profit to further their mission. Social enterprises contribute to reducing economic inequality, improving social justice and to environmental sustainability. After some discussion at LEYF we chose to retain our charitable status so we could use our Articles of Association or the rules of the LEYF charity as an asset lock. That meant we would be more assured that whatever we decided to do would be aligned to the rules of our charity and support the aims and purpose of the organisation which were to provide high quality nurseries, support staff with training and development and campaign for the rights of children and their families.

We rebranded as LEYF and started to operate as a social enterprise and put together an incremental plan to develop a sustainable and independent business by providing nurseries across London, selling places directly to parents, businesses, local authorities and other organisations using a cross-subsidy fee strategy which would allow us to support up to 35 per cent of children from disadvantaged families to attend the nurseries. I was keen we did not develop a traditional fundraising charity

approach but make sure the offer to the children was built into the very business model we designed.

Choosing where to site nurseries was an important factor. Most nurseries would be situated in neighbourhoods where families from both professional backgrounds and more disadvantaged backgrounds lived, so the children could be educated together in order to build trust and social capital and reduce social segregation. Several studies find desegregation to have a positive effect on outcomes of marginalised students, including pre-school age children. Studies point to several mechanisms which could evidence the relationship between social mixing in schools and attainment, including improved quality of teaching, exposure to diverse peer groups, positive peer effects, and raise expectations in home learning environments [13, 14]. However, we would also run nurseries in areas of high deprivation, as these were often forlorn neighbourhoods, characterised by high levels of economic exclusion without nurseries or where the quality of the nurseries was poor. These were areas where we noticed families were struggling with adverse childhood experiences and the resultant intergenerational outcomes of what is often called the toxic trio; mental health issues, substance abuse and domestic abuse, compromising a child's chance to thrive. Today, up to 77% of the LEYF nurseries are situated in these areas because every child matters and has the right benefit from the economic wellbeing that a nursery will bring into a neighbourhood through the direct provision of ECEC but also the additional economic contribution through employment and local spending [15, 16].

3. The LEYF pedagogy

A social enterprise childcare business model needs to be able to deliver a pedagogy which ensures every activity across the organisation supports and anchors its social purpose. Therefore, the business and pedagogical needed to combine seamlessly to shape the organisation and ensure that every aspect of the organisation's delivery was underpinned by an understanding of the factors that limit children's horizons, especially those from disadvantaged families and communities. We wanted to design a service with socially just practice at its very core and recruit, retain and train staff to have the theoretical and pedagogical knowledge to provide a rich pedagogy based on the context of what it is like to be growing up now [17, 18].

We understand pedagogy to be the understanding of how we lead children to learn and develop ensuring we use the teaching practices that will help us best deliver and enhance that learning. Pedagogy is rooted in values and beliefs about what we want for children [19]. Pedagogy means ensuring staff are able to teach children in a way that is developmentally age-appropriate and requires them to have an understanding of the importance of play and be able to employ relevant, creative and flexible teaching approaches and practices.

We took the view that this works best when we have favourable staff-child ratios in place that can positively impact pedagogy. Having good ratios that allows for effective interactions and relationships in an organisational climate of collaborative innovation which enable staff to contribute their own ideas and having their ideas heard and valued was predictive of classroom quality and better children's outcomes. In addition, it supported staff to form collaborative teams, build a stronger sense of the shared purpose and work on continuous quality improvement which also made a significant difference to the children's outcomes. Building organisational systems which moulded a culture of collaborative innovation proved to be an excellent way to connect and

reconnect staff with a sense of shared purpose. For example, using home learning cook a meal activities to support families struggling with food poverty.

We used the social pedagogy approach to shape the LEYF pedagogy because it focused on finding solutions to social problems, framed by relationships and social context while concentrating on the whole child, their families and their communities. Social pedagogy is essentially concerned with well-being, relationships and empowerment including children's rights. It reflects cultural attitudes and traditions including attitudes to modern childhood and children's upbringing, the relationship between the individual and society, and how society supports its disadvantaged or marginalised members. As a social enterprise created to support all children but especially those from disadvantaged backgrounds, we have developed a pedagogy that gives the child and the adults a strong voice and rejects the often deficit position associated with settings focused on the poorer and more deprived communities. This is a pedagogy underpinned by children's rights and participation. Given the importance of sustainability at LEYF, we were also very influenced by the social pedagogy notion of the theory and practice of creating a "thriving garden for children", a fertile self-sustaining ecosystem connecting the child's well-being and learning and resources to their surroundings [20].

That social pedagogy continues to evolve as a pedagogical response which identifies educational pathways to promote critical consciousness in all children so they can respond to societal changes that affect the relationship between the individual and society especially when there are risks of fragmentation and social exclusion remains important at LEYF. Our story of social pedagogy continues to be shaped by social pedagogues who courageously embrace a level of pedagogical fluidity that is driven by continual discussion and reflection as we observe and understand the changing world faced by our children [21]. Pedagogy needs to be updated, recreated and renovated within the changes of the new times, otherwise it loses its function and education will not be fit to support children as they navigate rapid social change and anticipate the unfolding future. Pedagogy is never about reproducing an educational model. The LEYF pedagogy incorporated the EYFS but in a way that is culturally contextual and situated within the whole LEYF approach. The LEYF pedagogy, in the spirit of social pedagogy, is dynamic, creative, and process-orientated rather than mechanical, procedural, and automated and this pedagogical fluidity has shaped our approach as we discovered more about children's development and adjusted to the changing context of their lives. The pedagogy is built on an understanding of knowledge as something in constant movement. It assumes that a connectivity between thinking and doing is of crucial importance to respond to social challenges [22].

The LEYF pedagogy fitted very comfortably within the concept of social pedagogy and our ambition to provide people with well-being and happiness recognising everyone's intrinsic worth and ability to reach their full potential. We were committed to promoting people's social functioning, inclusion, participation, social identity and social competence as members of society [23]. The guiding ethos of social pedagogy anchored the social purpose and the values of LEYF despite the many changes and shifts we implemented to develop a workable model. We were also influenced by the social pedagogy head, heart and hands approach to practice led by people who understand and were willing to share their professional, personal and private selves with the organisation for the good of the social purpose.

The role of the staff aligned very much to the social pedagogy approach where the curriculum was designed to support children to develop across the life course which included family and the wider community rather than the narrower focus only on

learning targets laid out in the UK and increasingly commonplace across the world. The LEYF approach very much sees the ECEC professional as someone who walks 'alongside' the children, teaching, guiding, reassuring and extending their learning.

We believe that pedagogies that are tightly linked to social purpose provide educational pathways to promote academic excellence for all children. Every LEYF teacher must be fully aware of the LEYF pedagogy and understand why each strand matters and how they interweave together to provide a framework for excellence. We strengthen the system by providing Pedagogical Coaches for each setting who help develop practice in the settings as well as providing staff training, coaching and support. Progress is measured termly using a self-reflective process of evaluating the LEYF Pedagogical Development Scale (LPDS). The data collected helps the Learning and Development Team monitor confidence of delivery and then use the information locally and centrally to identify what needs to happen to ensure quality is delivered consistently through all the pedagogical processes.

The resulting LEYF pedagogy is made up of seven interwoven strands, each one made from thousands of threads, all of which combine to form a strong learning rope which supports children, families and staff (**Figure 1**).

3.1 Leading for excellence

The leadership model was designed to recognise the centrality of our social purpose and the need to deliver and sustain excellent practice right across the organisation. Good social enterprises are not just values-led but also lead for excellence. LEYF set out a big ambition for children from the disadvantaged communities as central to leadership. We cannot assume that all adults in ECEC share our view about cultivating social justice through education as there a deficit attitude to teaching children from poorer communities is commonplace among children. Teachers often saw poverty as the result of personal negative attitudes towards education and an unwillingness to work hard. They were surprised to discover that poor people had similar educational aspirations to their more affluent families but believed the structural factors that led to poverty overwhelmed their abilities [24].

As well as thoroughly researched pedagogy and solid monitoring, good childcare social enterprises drive quality and improvement through practitioner-led action research, reflective practice and innovation. Leading using action research as part of the continuous cycle of improvement has led to many research projects which have progressed the service. Action research can be used at different levels in the organisation – from an apprentice interested in growing an area of pedagogical practice, to a nursery manager wanting to spread more sustainability across the organisation. It has been a success factor in how staff understand and generate knowledge about education and transform teachers' practice. Building quality is dependent on staff who understand their role in this and there is much benefit from involving staff in the delivery of a service – not just trying out something new but questioning why, what and how things are done, a pedagogical tango [25]. Action research has changed our practice and influenced the wider sector though our work on men working in childcare, the LEYF Early Years Chef Academy and the development of our Sustainability Strategy.

Doing action research has also helped us develop a self-reflective loop to create a culture where staff can continually both drive and respond to changes and use the emerging evidence to shape everyday practice and reframe their theories within a praxeological paradigm by connecting our head, our hands and our hearts. For many, social leaders action research is the space where staff question why, what and how'

DOI: http://dx.doi.org/10.5772/intechopen.112431

Figure 1.
LEYF Social Pedagogy.

things are done and use these questions to gather evidence to gain a greater knowledge of their impact on the service. In doing this, they build confidence, understanding and the capacity to make constructive changes for the better. Social leaders often use action research to develop a growth mindset among staff enabling them to have the courage to explore the pedagogical fluidity that is driven by continual discussion and reflection as we observe the changing world faced by our children.

The LEYF approach reflects leading a nursery through six key areas, each of which are of equal value to leading successfully (**Figure 2**).

To ensure we consistently deliver high quality ECEC for all children we need to build and retain an emotionally resilient workforce. This is particularly important where staff are routinely engaging in high levels of emotionally demanding work especially in the current context of recruitment shortages and insufficient funding. Interestingly, we found that shared purpose is often the reason that people join

Figure 2.
LEYF Social Leadership Model.

an organisation and stay. It outranks opportunities for professional growth, work environment and relationships with the team.

Staff are often attracted to work with children with high levels of need because they want to make a difference. We therefore need to ensure we build a culture of ambition, hope and empowerment for both the children and staff. Staff need to operate within a growth mindset thereby challenging the deficit attitude to teaching children from disadvantaged and poor community was commonplace among teachers [24]. Therefore, social leaders must encourage their staff to share their interests and enthusiasm for the life of the setting. This might be their music skills or ability to garden and share this with the children and colleagues.

This supports their underlying emphasis on building equitable relationships where each person whether adult or child is given a voice and empowered to use it through their practice. The underlying assumption is that everyone has a right to be heard and the opportunity to participate and the resulting relationships (which we refer to as harmonious relationships in LEYF) are not just with the children but with team colleagues, parents, other professionals, members of the local community and more recently through defining our relationship with our natural environment.

LEYF has designed a career pathway for staff, beginning with apprentices and learning all the way to a full Honours degree. This is in recognition of the importance of supporting staff, many of whom may have come from the local communities where ambition for them was also low. Providing staff with relevant training, coaching, wellbeing support and generous benefits is important especially emphasising a deep respect for human dignity.

One of the most effective ways of supporting leaders is through coaching. The LEYF approach to coaching is to allow staff to find their own solutions to issues in partnership with a coaching colleague. It is a process of conversation that is thought provoking and often helps unlock ideas and is a means of growing confidence which ultimately can maximise professional potential. Recent research on adult learners 'anxieties about new learning found that altered mindsets could have widespread benefits from many kinds of cognitive tasks [26]. People who reframed their frustration and did not try to avoid learning challenges performed significantly better when they had the support of a coach. They were encouraged to learn slowly using small steps, moving gently out of their comfort zone and using every new challenge as an opportunity to question the negative assumptions about their own abilities. This was particularly useful for staff at LEYF when we examined how we could address the continual challenge of managing change.

In the ECEC world change is continual; we developed the organisational LEYF 7a's approach to help embed a positive and constructive approach to organisational change. The 7as articulates the change journey for staff so they can understand each stage and focus on how we anchor and amplify the change successfully, so it is consistently anchored in practice by all staff in their workplace. It challenges the assumption that managing change is easily achieved through technical processes, but instead recognise the emotional elements along the change process which needs careful and informed change leadership that involves and motivates staff to want to change their practice (**Figure 3**).

3.2 Spiral curriculum

The LEYF pedagogy design was influenced by many ECEC, modern theorists and some of the thinking of some national curriculum frameworks as well emerging

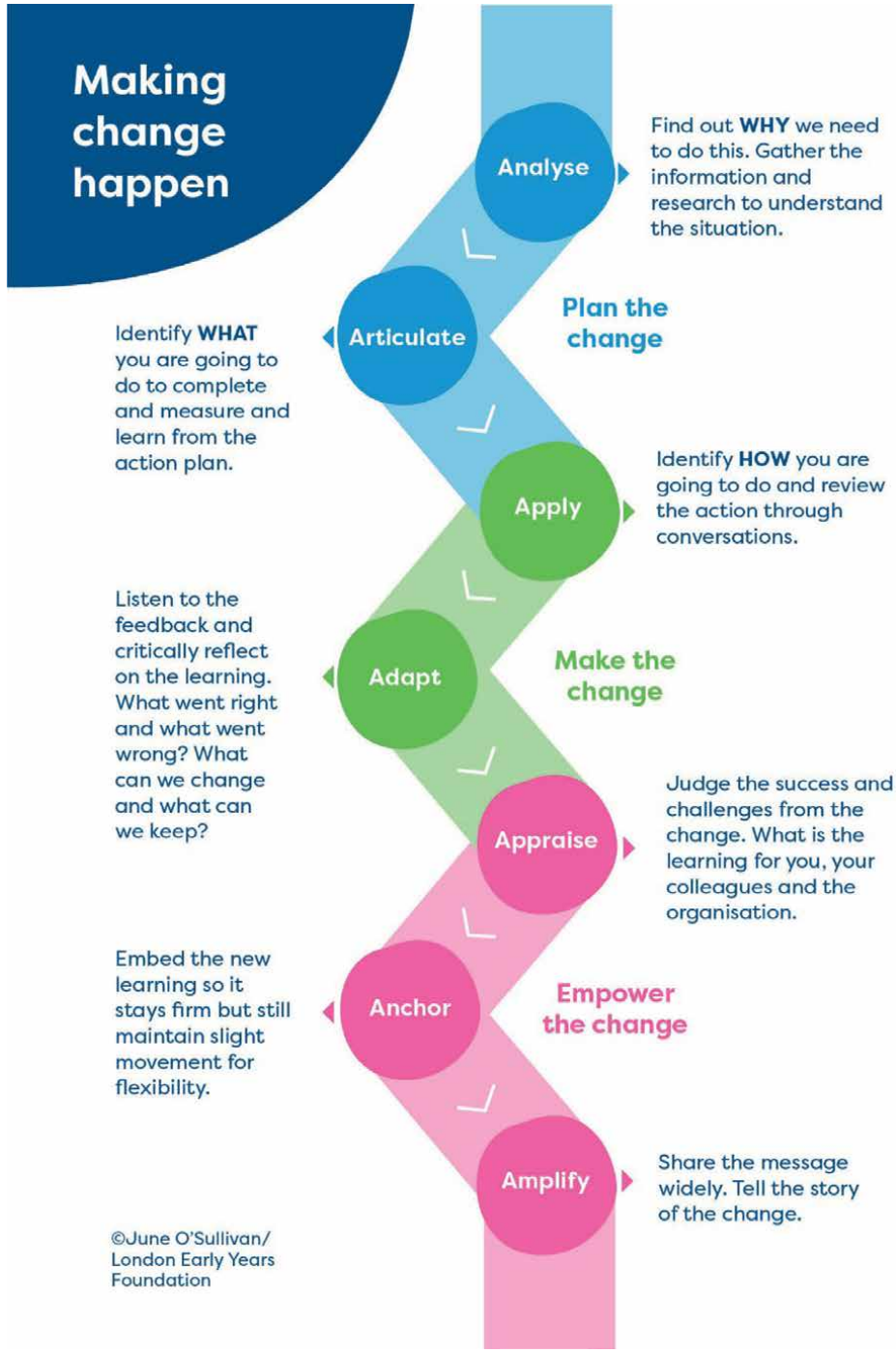

Figure 3.
LEYF 7As of Change.

knowledge about brain development. The LEYF Curriculum is portrayed as a spiral because children coil around their experiences and learning, rarely learning in a straight line. At LEYF this includes the enabling environment, harmonious

relationships, a strong home-learning environment and their local community. Inside the spiral is the teaching and learning designed to nurture, inspire and extend the creative and curious child. How children are enabled to learn is just as important as what they learn. LEYF staff are required to support children at a suitable pace, stretching and encouraging and celebrating as they move onwards on their learning adventure. This is often described as a strength-based approach with an appreciation of the strong human being, a view of children advocated by the Reggio Emilia approach as the strong, powerful, competent rich child in contrast to the deficit idea of the poor child. This means staff must know the child and their idiosyncrasies and understand their own role in helping children make friends, find their place and voice in the nursery and their community and value their thinking and independence. Social-enterprise nurseries need to have systems to make this happen as too many poor children are highly aware of their social position and the limitations it placed on them from an early age [27].

At LEYF, the cultural capital gap is directly linked to the children's access to an abundance of rich language especially as by three years of age, there could be a 30-million-word gap between children from the wealthiest and poorest families [28]. Therefore, a social-enterprise nursery must have language and literacy at its core. It must be so heavily language and literacy rich that droplets of gold fall from every interaction. Language does not consist only of words, sentences and stories: it incorporates art, dance, drama (including pretend play), mathematics, movements, rhythm and music. Children are learning to communicate their experience in many ways and to understand the ways in which others have communicated and represented experience. They are developing increasing competence in symbolic, abstract, imaginative and creative thinking. Language develops in meaningful contexts, when children have a need to know and a reason to communicate. Adults will need to understand and respect both verbal and non-verbal communication styles. All LEYF nurseries use techniques that support language development, especially children from more disadvantaged backgrounds, where language delay is more common. For example, Makaton, a language programme using signs and symbols, to help people to communicate, helicopter sessions developed to give children a voice and share their thinking and ideas through drama [29]. We also use Dialogical Reading, the practice whereby a child and adult share a picture book and focus on the picture book and story through talk, helping the child become the teller of the story and the adult the listener, the questioner, the audience for the child. The child has an active part in the reading experience, talks about the story and asks and answers the questions about the story is more effective in developing oral language than when adults just read the book to the child and supports their ability to develop their grammar, deepens their listening and comprehension, and the ability to elaborate and shape an argument [30].

Staff development is also designed to encourage and extend communication and language development, and great emphasis is placed on children hearing grammatically correct language, especially those bi and multi-lingual children at whose homes limited English is spoken. During the week, children at LEYF conduct their own planning meetings to ensure their voice is heard and staff are familiar with their interests. Children should have control over their own learning and play a role in learning how to learn and think about things. They are apprentices and with the right support use their boundless energy and enthusiasm to actively learn to perfect their skills and understanding and navigate their environment. We also seek children's views through exit interviews, which help us see the nursery from their perspective and make the necessary amendments.

At LEYF, staff focus on providing a wide variety of activities and experiences which offer breadth and balance to each child. Play is the best vehicle for this as it is vital for children's development and welfare. Play allows children to express strong feelings, rehearse experiences and interact socially, often with great enjoyment and therefore is the main medium through which we teach and includes a daily balance between free flow and child-initiated play, with planned activities that stimulate children's curiosity, creativity, wonder, fun, enthusiasm and enjoyment.

Social-enterprise nurseries must weave weekly outings into parts of the community that may seem closed to the children, like galleries, theatres, markets, restaurants and local-interest sites. Too many children live near parks or the sea or areas of outstanding interest to tourists but remain unfamiliar with them. Social-enterprise nurseries like LEYF must have inclusivity, equitable opportunities for participation and diversity at their heart. Celebrating and making children familiar and comfortable with their family heritage and, in the LEYF case, the predominant London cultures actively supports a positive self-esteem, thereby developing open and confident people, which contributes towards countering prejudice and has a significant impact on how they view themselves within their world as well as preparing them for their role in a globally connected world.

3.3 Enabling environments

Over 77% of LEYF nurseries are sited in neighbourhoods of high social disadvantage. Many of these areas have no nurseries or poor-quality nurseries often in forlorn and neglected environments, in poor repair with ill thought pedagogical designs. LEYF believe children deserve the right to be educated in appealing and attractive environments – places of beauty and order – and therefore every LEYF nursery conforms to a particular set of sustainable design principles, whether a new build or a refurbishment.

The environment needs to be child-oriented and stimulating as it operates as a third teacher [31]. Children need a space where they can explore, touch and learn without fear, using tools and utensils that fit their small hands and tables and chairs that match their small bodies. Each nursery has a visual timetable and children need to understand how the day operates so they are safe and secure. Independence is also encouraged by teaching a child practical life' skills through the routine, such as helping them learn to dress themselves, prepare and share meals, put their toys and clothes away and take an active part in their nursery and their neighbourhood.

The adult has a responsibility to provide wonderful sights, textures, sounds and smells for children; these are also a means of increasing cultural capital, and all LEYF nurseries provide the children with a selection of fresh and unusual vegetables in the role-play areas as a provocation for learning. A LEYF nursery should be homely with an emphasis on creating a secure and safe place where each person is entitled to respect and the best of care. This feeling of belonging contributes to inner well-being, security and identity. Our approach is akin to the view expressed by the United Nations Education for All which noted that education should not only include literacy and numeracy but also life skills, such as the ability to make well-balanced decisions, to resolve conflicts in a non-violent manner and to develop healthy lifestyles, good social relationships and responsibility, critical thinking, creative talents and other abilities which give children the tools they need to pursue their option in life [32]. This vision is entwined in all aspects of the day and helps children become independent.

We designed the LEYF Urban Outdoors Approach on the basis that children who display curiosity about their local and natural environment can explore, experiment, discover, interpret and evaluate their findings and so are more likely to continue to engage in these learning processes. Great social-enterprise nurseries can lead the way in how they collaborate within the community to create glorious natural wildernesses in unsightly abandoned spaces, which have the potential to be transformed. The focus is on giving children space, freedom and learning: from fire pits to mud kitchens and growing and digging, whether in window boxes or allotments, while playing an active role in exploring their local community spaces through daily walks and outings. This also aligns with the environmental strand of our approach to sustainability.

3.4 Harmonious relationship

Harmonious relationships promote children's well-being and help them to grow up as strong and independent people. Children who are nurtured by adults learn to form, develop and sustain positive, harmonious and empathetic relationships. The importance of personal empathy attunes us to the needs of individuals while social empathy connects us to the realities and injustices experienced by others. Social empathy involves recognising the limitations of our viewpoint by walking around in another's shoes and comparing their path with our own. It leads to a shared understanding of our reciprocal responsibilities echoing a principle of democracy. Building systems such as coaching, talent enrichment and development is central to helping staff to understand their own emotional reactions to their work, their relationships and their communication with children and others. Learning carries with it the responsibility for staff to apply their learning in ethical and effective ways.

This is also the basis of our approach to sustainability which involves deep transformations in values, new ways of thinking about problems, and the future [33]. We adopted the Random Act of Kindness philosophy to build harmony within the organisation and externally through local connections and an open-door approach. Kind actions are particularly important if relationships are to be sustained especially in a world where we need to be willing to respect difference especially when we have no personal experience of each other's situation.

The LEYF adult is best described as 'tuned in', which means staff:

- Apply strong child-development knowledge;
- Know how children learn;
- Sustain sensitive and positive relationships with everyone;
- Are sensitive, tuned-in adults who support children's learning by the warmth and encouragement;
- Develop a warm relationship with their key child;
- Help children to know they are lovable and valuable;
- Understand children's personalities and idiosyncrasies;
- Remain one step ahead of the children;

- Enjoy being with children and have lots of fun;
- Create an enabling environment;
- Are great conversationalists;
- Understand children's emotions and can calm and reassure them;
- Understand attachment and the impact this has on children;
- Listen carefully to children so they know they are heard and understood;
- Involve them appropriately in discussions and decisions, such as planning meetings, feedback projects and exit interviews;
- Provide appropriate help as soon as possible so children learn to feel safe;
- Support children with problem-solving;
- Help children understand and put into words their feelings and learn to regulate emotions and reason solutions to problems;
- Teach children that their distress and discomfort does not last forever so they can gradually learn to manage these;
- Always reflect on and think of how to make improvements.

One of the most effective ways of building harmonious relations while supporting learning is through pedagogical conversations. People like to talk and have deep conversations is often the place where through positive interaction and shared understanding new thinking and understanding emerges. Conversation is rarely an end in itself. It is usually an opportunity to inform, request or persuade in a way that leaves both parties better informed. The process of a conversation is complex and has an opportunity to address different levels of information, learning and exchange, while building mutual trust, respect and affection, inviting new thoughts and knowledge and encouraging active listening [34].

Social leaders design their parallel pedagogy with children and professionals that revolves around conversations. Their conversations with children, are designed to genuinely find out what the children think and feel, and are central to developing their sense of voice, self-expression and autonomy. At the same time, conversations with and among professionals are key for developing not just the same characteristics but for enabling a virtuous cycle where they can have their own personal conversations with children. The focus lies upon coming to some greater understanding rather than winning the argument [35]. Powerful conversations can be pedagogical conversations (to implement a social pedagogy successfully), coaching conversations (to grow the leadership of others), reflective professional conversations (to embed a culture of collaborative innovation) and wider network and public conversations.

Staff at LEYF are trained to become good pedagogical conversationalists which builds confidence and emotional intelligence. This was in response to findings that found many staff were reluctant to engage in pedagogical conversations because they

found it difficult to articulate or describe in any detail the specifics of their practice that were important to them [36]. They were stronger on the "what" and "how" but less confident on "why". Therefore, the LEYF pedagogical conversation is structured around two key words **"because"** and **"so"** because these two words remind the conversationalist to introduce the rationale for the conversation, engage the other person and help explain and conclude the conversation in a helpful and constructive manner, which encourages better and more confident conversations.

3.5 Safe, fit and healthy

Children attending a social-enterprise nursery need to be provided with a healthy, well-balanced diet with varied menus using fresh seasonal foods and simple ingredients. LEYF tries to buy locally produced goods and local sustainable communities. Healthy food for healthy children is important if we look at the ongoing child health crisis in the UK, with obesity acutely affecting children from disadvantaged backgrounds [37].

The LEYF response to the growing child obesity epidemic was to consider how we might better use nursery chefs to provide high quality nutritious home cooked food to children, that aligned with our sustainability strategy by being seasonal and locally grown where possible. Chefs are members of the LEYF Chef Academy and invited to complete the Level 3 Diploma in Professional Cooking for Early Years Chefs. This qualification was designed by LEYF because there was no specific qualification to teach chefs about procuring, preparing, cooking and serving nursery children and be able to support parents and staff to understand the importance of providing a balanced diet for the children. It is essential that children eat a healthy diet to ensure that they receive the nutrition they require for their physical and cognitive growth. This phase is also a critical time for children to learn about food and develop good eating habits that will influence their health and well-being in later life. Therefore, the overall aim of the Chef Academy was to ensure more children are getting the healthy, nutritious food they need to grow and learn, by training chefs to be experts in child nutrition and food education. The calibre of an early-years chef needs to be high, especially when feeding children where poverty or disadvantage impedes them receiving nutritious food at home.

Many children from poor neighbourhoods attend nurseries either hungry or undernourished. They are often obese, because poor families often rely on high-calorie, low-cost food [38]. Children cannot learn if they are hungry, and therefore it's imperative we address this as a matter of course. Eating habits are developed from a young age and messages about healthy lifestyles are best absorbed then. Nurseries can open children's eyes to foods they may never have eaten, and mealtimes are particularly important at LEYF as children learn to eat correctly, using good table manners so they can be socially confident in any type of environment from restaurants to the school canteen. It is unacceptable not to broaden children's horizons from the earliest age in order to build their social capital.

Many children live in tiny, cramped spaces or in high-crime neighbourhoods where they are kept indoors because parents are fearful of letting them play outside. There is also a correlation between growing levels of childhood obesity with poor physical skills, and this is more common among children from disadvantaged backgrounds. Therefore, understanding physical development and placing a high emphasis on active movement is critical in a social enterprise nursery. Movement is essential to the development of the nerve cells that form the neurological system fundamental

to our survival by creating the connections needed to develop our proprioceptive and vestibular senses which are linked to our sense of 'gravitational security which ensures we do not fall over and keeps us feeling safe and secure as we go about our lives. Having a garden and continual access to outdoors is important. For example research conducted by LEYF with the social enterprise Bikeworks highlighted the lack of confidence of many children, staff and parents about cycling and we refocused our efforts to support children to become confident cyclists as well as developing a bike lending scheme for parents and cycling training for staff.

3.6 Home learning environment (HLE)

A wide range of research has concluded that the quality of the Home Learning Environment (HLE) is one of the main determinants of children's development. Findings from confirm that the quality of the HLE is more important for children's intellectual and social development than parental occupation, education or income. Interventions that supported high-quality HLEs were a powerful lever in raising the attainment of disadvantaged children, tackling inequalities and having a significant impact on reading, maths and pro-social behaviours. They also noted that parents with English as an additional language lacked confidence about the best ways to support their child's development at home. There were also gender differences – for example, fathers were less likely to read to their children than mothers [39].

Given the importance of Home Learning in addressing disadvantage, LEYF conducted action research to design our own approach. We began from the premise that the most effective settings were pro-active in offering advice on how parents could complement the setting's educational aims within the HLE and auditing of parent's needs, with targeted intervention was more successful than a 'one size fits all' approach. The LEYF study explored the notion of categories of parents, and their attitude to home learning and their levels of parenting confidence. Four groups emerged, the inquisitive parent was the most dominant type in the study, interpreting home learning as activities providing opportunities to understand how their children were developing. The social parent understood home learning as the provision of expert advice and a route to creating social interaction for the child at home and in the community with other parents. The enthusiastic parents considered home learning as set of planned home teaching activities provided with the guidance and support from the experts in the nurseries. Finally, the apprehensive parent relied on expert advice from staff to build their confidence to support her child's development. Interestingly, like many studies, the answers also raised other questions for example no respondent associated home learning with fun or saw home learning as a source of playing and learning which resulted in us thinking harder about narrating the power of HLE to connecting joyfully with their children with play as central to them learning together [40].

Conversations with a pedagogical twist have proved to be the most effective means of introducing parents at LEYF to their children's learning because they helped build on the relationship with parents while exploring their children's development and interests. Staff, once confident and trained in the 'LEYF HLE know-how' adapt their conversation to each parent's needs, interests, language and use a range of opportunities to have the conversation that are less intrusive and more inclusive. In addition, home-learning resources to support and provoke conversations such as sending a dinner recipe home with the ingredients to encourage a shared cooking activity as well as a supporting parents to use the dialogic reading techniques to help their children become the story tellers and in doing so build parents confidence especially those

with less confident English to support their children to become readers. Employing empathetic and respectful staff who are alert to the challenges parents are experiencing and willing to build social capital by creating opportunities for networking, encouraging activities that create shared opportunities for meeting and participating in community activities while maintaining raised expectations for the children are central to the success of the home learning environment approach.

3.7 Multi-generational approach

The final element of the LEYF pedagogy is the multi–generational approach. This is based on the premise that nurseries are an essential part of the local community, with a key role in promoting children's sense of belonging while also contributing to the local heritage and future. The LEYF multi-generational model places significant value for children to be able to connect with the wider community, nurture extended kinship, become familiar with their neighbourhood and develop a positive attitude to forming relationships with adults of all ages. It is important that children have a connection to where they are growing up. In large cities like London, that is even more important and a multigeneration approach connects the history of the area from older people with the reshaping for your adults and the future for children. It also weaves our third strand of sustainability into the approach therefore committing to protecting its environment, nurturing the local biodiversity and green spaces through shared allotments, community gardens and city farms. This benefits the behaviour and wellbeing of children, connects families across local networks and builds social capital. Research from the Beth Johnson Foundation [41] supports multi-generational practice as important in promoting health, development and equality across multiple generations through interdisciplinary practice, education, research and community-based partnerships. What we do at LEYF is engage with local communities and build collaboration to deepen the community relationships. Nurseries can be catalyst for positive community engagement helping to build better community health and wellbeing which means children grow up feeling safer, less likely to commit crime and ultimately benefit from improved educational performance and greater life satisfaction. It was beautifully articulated by Archbishop Desmond Tutu in his definition of *Ubuntu,* a Southern African concept which best translates as a person is a person through other people [42].

4. Conclusion

Today, LEYF is the largest charitable childcare social enterprise in the UK, with 40 community nurseries, employing 850 staff including 100 apprentices to provide 4500 children with high quality education and care. The social-enterprise model as defined by the LEYF is one way of providing ECEC to children from disadvantaged families or living in disadvantaged neighbourhoods. It is a model built on trust, a sense of human dignity and hope for the future. It is a new source of positive social change, navigating between the different modes of business-led and government-led transformation.

The key question for consideration is that given how much we know about the benefits of ECEC for all children but especially those from disadvantaged backgrounds, why are childcare social enterprises not replicated? Right now, the models of ECEC available for children from disadvantaged children are not effective. They rely on the goodwill of individuals or settings wanting to do something positive for

children from disadvantaged communities or disjointed political initiatives. Neither result in a sustained national policy approach which could remove the ECEC lottery which fails too many children.

The LEYF approach has demonstrated that it can be replicated across London especially while also generating cultural and social capital and delivering social impact. We therefore need a national conversation about ways to extend the LEYF model more widely, by using a range of funding and investment models designed to make ECEC accessible and affordable and in doing so reduce child poverty and support parental employment as part of the national economic infrastructure. This would be a win not just for children living with disadvantage but for all of society.

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Chapter 11

Perspectives on Preschool Education and Care

Awudu Salaam Mohammed

Abstract

This research explores the various perspectives on preschool education and care, including historical, philosophical and methodological perspectives. The study provides an overview of different models of preschool education, such as play-based, academic, Montessori, Reggio Emilia and Waldorf, and examines the role of curriculum and assessment in supporting children's learning and development. Additionally, the study highlights the importance of teachers and caregivers in creating a safe and supportive learning environment for young children and the significance of family involvement in preschool education and care. The research also discusses the challenges and opportunities in providing quality preschool education and care, including funding and access issues. Finally, the study explores emerging trends and analyses in the field, including the use of technology in the classroom and the role of preschool in closing the achievement gap. Through a qualitative research approach, literature was reviewed, categorised, and analysed to understand the diverse perspectives better on preschool education and care and their impact on young children's development and future success.

Keywords: assessment, care, child-centred, pedagogy, perspectives, play-based, preschool, supportive

1. Introduction

Early childhood education and care is a critical phase in children's lives, laying the foundation for their future academic, social and emotional development. Preschool education and care programmes aim to support young children's learning and development, allowing them to explore, experiment and develop their skills in a safe and supportive environment [1]. However, there are multiple perspectives and approaches to preschool education and care, each with guiding principles and methods. In this chapter, we will explore these different perspectives and approaches to early childhood education and care, including the models of preschool education, the philosophies and methods that guide preschool education, the role of teachers and caregivers, family involvement, quality standards, challenges, opportunities and future directions. By understanding these diverse perspectives, we can gain a comprehensive understanding of the field of early childhood education and its impact on children's lifelong learning and success.

2. Methodology

Perspectives on preschool education and care were reviewed and analysed using a qualitative research technique. Through academic resources, including ERIC, JSTOR, Google Scholar and EBSCOhost, pertinent papers, books and reports were found using a systematic review methodology [2]. Preschool education, early childhood education, play-based learning, curriculum and evaluation, teacher and carer responsibilities, family participation and quality standards were some of the search phrases used. Publications focusing on perspectives, strategies or tactics associated with preschool education and care met the inclusion requirements. Publications with a primary or secondary school theme were excluded.

A total of 59 papers were chosen for examination after the screening. A theme analysis method was used to read the publications and code them. The categories and subcategories formed from the codes were honed after recurrent analysis [2]. Among the types were historical views, preschool education paradigms, philosophical and methodological underpinnings, curriculum and assessment, responsibilities of teachers and carers, parental engagement, quality standards, possibilities and difficulties and future orientations.

The study included locating patterns, trends, and gaps in the literature and analysing [3] the benefits and drawbacks of various methods and procedures. The results were presented utilising important topics and ideas. The study's limitations included the possibility of bias in the choice and analysis of publications and the constrained breadth of the literature review. Yet, the study offers a thorough summary of the state-of-the-art regarding various perspectives on preschool education and care.

3. Importance of early childhood education and care

Early childhood education and care (ECEC) are a critical phase in a child's development [4]. Research shows that providing quality preschool education and care can have numerous benefits. Quality ECEC programmes provide children with opportunities to explore, experiment and develop their skills in a safe and supportive environment, helping them to achieve academic, social and emotional success. One of the most significant benefits of quality preschool education and care is improved educational outcomes. Siraj et al. [5] contend that Children who attend quality ECEC programmes have better literacy, numeracy, and cognitive skills than those who do not. This is because quality ECEC programmes support children's early learning and development, providing them opportunities to engage in activities that build their foundational language, literacy and numeracy skills. This strong foundation can positively impact children's academic success throughout their schooling and beyond [6].

In addition to educational benefits, quality preschool education and care can also have significant social-emotional benefits for children. Preschool programmes allow children to interact with peers, learn social skills and develop positive relationships with adults. This social interaction can help children to develop empathy, communication skills and a sense of belonging, which are crucial for success in school and life [7].

Finally, quality preschool education and care can also benefit children emotionally. According to Bierman et al. [8], preschool programmes provide a safe and supportive environment where children can explore their emotions, develop self-regulation skills, and build resilience. This emotional support can help children manage stress, cope with difficult situations and build self-esteem.

Providing quality preschool education and care is crucial to a child's future. It supports children's holistic development, laying the foundation for future academic, social and emotional success. By providing children with the tools, they need to succeed in school and beyond, quality preschool education and care can help to close the achievement gap and promote a brighter future for all children [9].

4. The evolution of early childhood education and care from informal caregiving to formalised preschool programmes

Early childhood education and care have evolved significantly, from informal caregiving provided by family members and neighbours to formalised preschool programmes now widely recognised as essential to early childhood development. In the early days of childcare, families relied on informal caregiving provided by family members, neighbours, or hired help [10]. Children were often left to play and explore independently, with limited adult supervision or structured activities. This informal approach to childcare began to change during the Industrial Revolution, as more parents began working outside the home and needed reliable childcare options [11].

Friendly and Prentice [12] noted that formalised preschool programmes began to emerge in the late 19th and early 20th centuries, mainly in response to the needs of low-income families. These early programmes were often operated by charitable organisations or religious groups and focused on providing basic care and education to children of working-class families. In the mid-20th century, early childhood education and care began to gain greater recognition as a crucial component of child development [13]. Zhang et al. [14] posit that early childhood experiences could impact children's cognitive, social and emotional development. This led to a greater emphasis on early childhood education and care, with policymakers and educators recognising the importance of providing quality preschool programmes to all children, regardless of socioeconomic status.

Today, formalised preschool programmes are widely recognised as an essential component of early childhood education and care, focusing on providing high-quality care and education that support children's holistic development. Preschool programmes are now available to children of all ages and socioeconomic backgrounds, with various approaches and philosophies that guide their operation [15].

Overall, the evolution of early childhood education and care from informal caregiving to formalised preschool programs reflects a growing recognition of the importance of early childhood experiences on a child's development. Quality early childhood education and care can support children's learning and development, laying the foundation for future academic, social and emotional success [15].

5. Models of preschool education

The views of Rustamova [16] show that preschool education models have evolved to reflect different approaches to early childhood development and education. Each model has its unique philosophy and practice for teaching and learning. Understanding their differences can help parents and educators decide which model best suits their child's needs.

Play-based learning is among the most popular preschool education models [16]. This approach focuses on learning through play, emphasising child-led exploration

and experimentation. Play-based programmes typically include structured and unstructured play activities, focusing on developing social and emotional skills and foundational academic skills. On the other hand, educational preschool programmes focus more on structured learning and academic preparation [17]. These programmes often use formal teaching methods to develop literacy, numeracy and other academic skills. While educational preschool programmes can effectively prepare children for later schooling, some critics argue that they can be too focused on academic achievement at the expense of social and emotional development [18].

Research shows that [19] Montessori preschool programmes are based on the principles of Maria Montessori, an Italian physician and educator. These programmes emphasise hands-on learning and self-directed exploration, developing practical life skills and independence. Montessori programmes typically use specialised materials and equipment to promote sensory exploration and self-discovery. Reggio Emilia preschool programmes are inspired by the educational philosophy developed in the Reggio Emilia region of Italy. These programmes focus on child-led learning, emphasising collaboration, creativity, and critical thinking. Reggio Emilia programs often involve long-term projects allowing children to explore topics in-depth and develop problem-solving skills [20].

In conclusion [21], Rudolf Steiner, an Austrian philosopher and educator, is the foundation of the educational philosophy used in Waldorf preschool programmes. With a focus on the arts, outdoors and experiential learning, these programmes emphasise holistic development. Children are frequently engaged in learning and encouraged to express themselves creatively *via* song, dancing, and storytelling in Waldorf programmes. Each of these preschool education models has its strengths and weaknesses, and parents and educators must carefully consider their child's individual needs and learning style when choosing a preschool program. By understanding the different models of preschool education available, parents and educators can make informed decisions about which program best suits their child's needs, ensuring that they receive the support and education they need to thrive.

6. Philosophies and methods that guide preschool education

Researchers [22] believe preschool education is guided by different philosophies and methods that inform teaching practices and curriculum design. These philosophies and methods are rooted in various theories of learning and development, and they can significantly impact how children approach learning and interact with their environment. One of the most influential philosophies that guide preschool education is constructivism. This approach is based on the idea that children actively construct their understanding of the world around them through their experiences and interactions with their environment. Teachers who embrace constructivism view their role as facilitators of learning, providing opportunities for children to explore and discover on their own [23].

Matta [24] believes that another philosophy that has gained popularity in recent years is social constructivism. This approach emphasises the social and cultural context in which learning occurs and the importance of social interaction and collaboration in the learning process. Teachers who embrace social constructivism see their role as creating a supportive environment where children can learn from one another and their interactions with the world around them. Behaviourism is

another philosophy that has had a significant impact on preschool education. This approach focuses on observable behaviours and rewards and punishments to shape behaviour. Teachers who embrace behaviourism use positive reinforcement to encourage desired behaviours and negative reinforcement to discourage undesired behaviours [25].

In addition to these philosophies, preschool education is guided by various methods and approaches, including play-based, project-based and inquiry-based learning. Play-based learning emphasises the importance of free play and exploration in early childhood education. In contrast, project-based learning encourages children to work collaboratively on long-term projects that allow them to explore topics in depth. Inquiry-based learning is an approach that encourages children to ask questions and seek answers through their investigations and research [26].

Ultimately, the philosophies and methods that guide preschool education are shaped by the underlying theories of learning and development that inform them. By understanding these different philosophies and techniques, educators can make informed decisions about how to structure their curriculum and teaching practices to best support the needs of their students.

7. The role of curriculum and assessment in supporting children's learning and development

The curriculum and assessment are two critical components of early childhood education that significantly support children's learning and development. A well-designed curriculum can provide children with a structured, purposeful learning environment promoting growth and development. At the same time, practical assessment can help teachers to understand children's progress and tailor their instruction to meet individual needs [27].

One approach to designing a preschool curriculum is using an emergent curriculum. An emergent curriculum is a flexible, child-centred approach emphasising children's interests and experiences. Teachers using this approach observe and listen to children, taking note of their interests and curiosities and then design curriculum activities and experiences based on those interests. An emergent curriculum encourages children to participate in their learning actively, promotes engagement and motivation and supports their overall development [28]. Assessment in early childhood education is often focused on formative assessment, and designed to provide ongoing feedback to teachers and children. Formative assessment involves observation, documentation and reflection to understand children's progress and adjust instruction accordingly. This approach allows teachers to identify areas where children may be struggling and provide targeted support to help them succeed.

In addition to these approaches, a range of assessment tools is available to preschool educators, including standardised assessments, developmental screenings and progress monitoring tools. However, it is essential to note that early childhood education assessment should be used to support children's learning and growth rather than evaluate their worth or potential [29].

Ultimately, the curriculum and assessment play critical roles in supporting children's learning and development in preschool. Educators can provide children with the support they need to thrive and reach their full potential by using a child-centred approach to curriculum design and ongoing formative assessment.

8. Teacher and caregiver roles

Quigley and Hall [30] noted that teachers and caregivers play a crucial role in creating a safe and supportive learning environment for young children in preschool. They provide the necessary care, support, and guidance to help children thrive and develop to their full potential. In the preschool setting, teachers and caregivers wear many hats. They are responsible for designing and implementing a developmentally appropriate curriculum that is responsive to the needs and interests of each child. They are also responsible for establishing a positive classroom culture that promotes respect, cooperation and collaboration among children. Additionally, teachers and caregivers must ensure that each child's physical and emotional needs are met, including providing appropriate nutrition, rest and opportunities for physical activity [31].

One important aspect of the teacher and caregiver role is building relationships with children and their families [30]. By fostering positive relationships with children and their families, teachers and caregivers can create a sense of trust and belonging that supports children's overall development. This can involve communicating regularly with families about their child's progress, interests and needs and inviting families to participate in classroom activities and events.

Gilmore et al. [32] explain that teachers and caregivers must have various skills and knowledge to be effective in their roles. This includes understanding child development, designing and implementing a developmentally appropriate curriculum and managing challenging behaviour in a positive and supportive way. Teachers and caregivers must also have strong communication skills and the ability to work collaboratively with colleagues, families and community partners.

Ultimately, the importance of teachers and caregivers in creating a safe and supportive learning environment for young children cannot be overstated. Providing high-quality care and education can help young children develop the knowledge, skills and confidence they need to succeed in school and life by ensuring a conducive environment to support children's learning.

8.1 Supportive environment for children

The views of Youn et al. [33] provide that a supportive environment for children involves creating a safe, nurturing and engaging space that meets their developmental needs. Here are some ways to provide a supportive environment for children, along with examples:

8.1.1 Physical environment

Ensure that the physical space is safe and comfortable for children. For example, provide child-sized furniture, soft cushions and age-appropriate toys that encourage exploration and play [34].

8.1.2 Emotional environment

Create an emotionally supportive environment that promotes positive relationships and a sense of belonging. For example, welcome children with a warm smile and offer encouragement, praise and support when needed [35].

8.1.3 Structured routine

Establish a predictable pattern that provides children security and familiarity. For example, a daily schedule includes time for play, rest and learning activities [36].

8.1.4 Age-appropriate materials

Provide materials that are developmentally appropriate for children. For example, they offer toys and learning materials that support their interests and abilities, such as building blocks for toddlers or books with large print for beginning readers [37].

8.1.5 Positive reinforcement

Use positive reinforcement to encourage positive behaviour and foster a sense of self-esteem and confidence in children. For example, offer praise and rewards for good behaviour, such as stickers or small treats [38].

8.1.6 Collaborative approach

Work collaboratively with parents and caregivers to provide a supportive environment for children [34]. For example, communicate regularly with parents to share information about their child's progress, strengths, and areas for improvement.

9. The significance of family involvement in preschool education and care

Family involvement is a critical component of preschool education and care. Research has consistently shown that when families are engaged in their children's learning, children are more likely to succeed academically, develop positive social-emotional skills and have better long-term outcomes. This is why it is vital for teachers and caregivers to actively seek out ways to involve families in the learning process [39]. One of the essential strategies for engaging families is regular communication. Teachers and caregivers should establish open lines of communication with families and share information about the child's learning and development. This can include daily updates, weekly newsletters, parent-teacher conferences and progress reports. It is also essential to be responsive to families' questions and concerns and to provide opportunities for families to share their insights and experiences.

Kuttner et al. [40] identified another effective way to involve families: inviting them to participate in classroom activities and events. This can include volunteer opportunities, parent workshops and family celebrations. Teachers and caregivers can create a sense of community and support by applying families in these activities and showing families they are valued partners in their child's education.

Finally, it is essential to recognise and respect families' diverse cultural backgrounds and perspectives. Teachers and caregivers should strive to create a culturally responsive learning environment that reflects and celebrates the diversity of the children and families they serve. This can include incorporating multicultural books and materials, inviting families to share their cultural traditions and practices and adapting curriculum and teaching strategies to meet each child's unique needs and interests [41].

In conclusion, family involvement is critical to preschool education and care. Teachers and caregivers can create a strong partnership that supports children's overall development and success by actively involving families in the learning process.

10. Quality standards for early childhood education and care programmes

Quality standards are guidelines and criteria used to measure the quality of early childhood education and care programmes [42]. These standards ensure that children receive high-quality care and education that support their learning and development. Several quality standards are used in early childhood education and care programmes, including licencing, accreditation and programme standards.

Licencing standards are the minimum requirements a programme must meet to be licenced by the state or local government. These standards typically include provisions related to health and safety, such as staff-to-child ratios, background checks for staff and the cleanliness and security of the physical environment [43]. Accreditation standards are voluntary standards that programmes can meet to demonstrate their commitment to high-quality care and education. Accreditation standards are typically more rigorous than licencing standards and often include curriculum, teacher qualifications, family involvement and program administration requirements.

Programme standards are guidelines and criteria used to assess the quality of a programme's curriculum, teaching practices and overall program structure [44]. Programme standards may be developed by state or local government agencies, professional organisations, or advocacy groups. Some examples of quality standards in early childhood education and care programs include the National Association for the Education of Young Children's (NAEYC) accreditation standards, the Head Start Programme Performance Standards and the Quality Rating and Improvement Systems (QRIS) [45] used by many states. In addition to promoting high-quality care and education for children, quality standards provide a framework for continuous improvement. Programs that meet or exceed quality standards are more likely to provide positive outcomes for children, including improved academic and social-emotional development, and are better positioned to support the diverse needs of families and communities.

In conclusion, quality standards are essential to early childhood education and care programs. They help ensure that programs provide high-quality care and education supporting children's development and success. By meeting or exceeding quality standards, programs can demonstrate their commitment to continuous improvement and provide families with the confidence and reassurance that their children receive the best possible care and education.

11. Challenges and opportunities in providing quality preschool education and care

Providing quality preschool education and care is essential for young children to develop the skills and knowledge they need to succeed in school and beyond [46]. However, several challenges and opportunities arise in providing quality preschool education and care, including funding and access issues. Funding is one of the biggest challenges many preschool education and care programs face. High-quality programs require a significant investment of resources, including trained teachers and

staff, appropriate materials and equipment, and safe and well-maintained facilities. However, many programs struggle to secure the funding needed to provide these resources, limiting their ability to provide high-quality care and education [47].

In addition to funding challenges, there are also issues related to access. Many families, particularly those from low-income or marginalised communities, may not have access to high-quality preschool education and care programs due to geographic, financial or other barriers. This can lead to inequities in educational outcomes and opportunities, with children from disadvantaged backgrounds often starting school at a disadvantage compared to their more affluent peers [48]. Despite these challenges, there are opportunities to address them and promote access to high-quality preschool education and care. For example, several funding sources are available for early childhood education and care programs, including federal and state grants, private donations, and corporate sponsorships. By leveraging these resources and developing partnerships with community organisations, programs can better meet the needs of the children and families they serve.

In addition to funding, there are opportunities to address access issues through innovative program models and approaches. For example, some programs may offer extended hours or transportation services to accommodate better-working families' needs. Others may partner with community organisations to provide healthcare, social services, education and care. Ultimately, addressing the challenges and opportunities in providing quality preschool education and care requires a coordinated and collaborative effort across all sectors of society. By working together, policymakers, educators, families and community leaders can help ensure that all children have access to the high-quality care and education they need to succeed.

12. Future directions in emerging trends and research in early childhood education and care: use of technology and closing the achievement gap

As we look to the future of early childhood education and care, several emerging trends and research areas are shaping the field. Two critical areas of focus are the use of technology in the classroom and the role of preschool in closing the achievement gap. The use of technology in early childhood education and care can transform how young children learn and engage with the world around them [11]. Educational technology, such as interactive whiteboards, tablets, and educational apps, can enhance learning opportunities and support children's development in various areas, including literacy, numeracy and social-emotional skills. However, it is crucial to ensure that technology is used developmentally appropriately and that teachers and caregivers receive appropriate training and support to integrate technology effectively into their teaching practices [49].

Another important area of research in early childhood education and care is the role of preschool in closing the achievement gap. Research has consistently shown that children from low-income and marginalised communities often start school with significant disadvantages compared to their more affluent peers. High-quality preschool programs have the potential to help close this gap by providing young children with the skills and knowledge they need to succeed in school and beyond [50]. In addition to these specific research areas, there is a growing emphasis on diversity, equity and inclusion in early childhood education and care. This includes focusing on culturally responsive teaching practices, an anti-bias curriculum and efforts to create more diverse and inclusive learning environments [50].

In future, it will be necessary for researchers, educators and policymakers to continue collaborating and innovating to ensure that all young children have access to high-quality early childhood education and care. By embracing emerging trends and research, we can better support the learning and development of young children and help close the achievement gap for all. The onus of this is significantly the impact of technology on preschool education and care [51].

12.1 The impact of technology on preschool education and care

Technology is becoming an increasingly common tool used in preschool education and care. While there are benefits to incorporating technology, such as providing new opportunities for learning and engaging students in interactive ways, there are also potential drawbacks that need to be considered [52]. One potential benefit of technology in preschool education is that it can offer various interactive and engaging learning experiences. For example, digital games, interactive whiteboards and tablet apps can help teach literacy, numeracy and problem-solving skills in fun and engaging ways.

Another advantage of technology is that it provides teachers and students access to more resources. For instance, video conferencing tools can allow for virtual classroom visits or remote learning opportunities. At the same time, online databases and digital libraries can provide access to a vast array of educational materials. However, some potential drawbacks exist to using technology in preschool education and care. One concern is that technology may be too stimulating for young children, leading to an overreliance on screens and potentially negatively impacting attention span and cognitive development. There are also concerns about privacy and security risks associated with collecting and storing children's data through technology [53].

Educators and caregivers must know the benefits and potential drawbacks of incorporating technology into preschool education and care. Technology should be integrated into a balanced and developmentally appropriate curriculum to ensure technology is used effectively and appropriately [54]. Educators should receive proper training on using technology as a learning tool. Additionally, strict protocols should be in place to protect children's privacy and security. Overall, technology can be helpful in preschool education and care when used thoughtfully and with intention.

12.2 How young children learn

Vartiainen et al. [55] propose that young children learn through various methods, including observation, exploration, experimentation and imitation. Here are some examples of how young children learn:

12.2.1 Observation

Children learn by watching and observing the people and things around them. For example, a child may observe their parent cooking dinner and then try to imitate the actions when playing with their toy kitchen.

12.2.2 Exploration

Young children are naturally curious and enjoy exploring their environment. They understand their properties and functions by touching, smelling, tasting and feeling

different objects. For example, a child may explore a block by stacking it, knocking it over or feeling its texture.

12.2.3 Experimentation

Children learn by experimenting and testing their theories. For example, a child may try pouring water from a cup to see how it flows or mix different paint colours to see what new colours are created.

12.2.4 Imitation

Young children often learn by imitating the actions and behaviours of others. For example, a child may mimic how their parent speaks or how they hold a pencil when learning to write.

Overall, young children learn through play, exploration, experimentation and social interaction. These experiences help children develop cognitive, social, emotional and physical skills, setting a solid foundation for lifelong learning.

12.3 The values of play-based learning in preschool education

The play-based learning pedagogical approach to preschool education emphasises the relevance of children's play in their learning and development. It is predicated on the notion that children learn best *via* experience play that is developmentally appropriate and supervised by informed and trained teachers. The following core principles of play-based learning in preschool education [56]:

12.3.1 Active learning

Children are encouraged to interact actively with their surroundings, explore, experiment and learn new things through play-based learning. It promotes critical thinking and problem-solving abilities.

12.3.2 Social-emotional development

Children who learn *via* play can better communicate, self-regulate and acquire critical social-emotional skills. Playing with others teaches children how to get along with others from diverse backgrounds, handle disagreements and create lasting bonds.

12.3.3 Creativity and imagination

Children's curiosity and creativity are encouraged *via* play-based learning, which is crucial for their cognitive and emotional growth. During imaginative play, children may try out various roles, explore novel concepts and refine their perspectives.

12.3.4 Holistic development

Play-based learning encourages children's development, including physical, cognitive, social-emotional and linguistic growth. Play can help children develop their cognitive abilities, language and literacy, fine and gross motor and cognitive abilities.

12.3.5 Child-centred learning

Play-based learning is child-centred, which means children take an active role in their education. Although teachers offer direction and encouragement, students are urged to take charge of their education and follow their interests.

To sum up, play-based learning is an approach to preschool education that is effective and encourages active learning, social and emotional development, creativity and imagination, holistic development and child-centred learning. Preschool instructors may build a supportive and stimulating learning environment that supports young children's growth and development by including play in their curriculum.

12.4 How cultural, social, and economic aspects affect policies and practices

We can encourage children's general growth and development and provide a solid foundation for lifetime learning by offering a supportive atmosphere that suits their developmental needs. Cultural, social and economic factors can significantly influence policies and practices about preschool education. Here are a few strategies [57].

12.4.1 Cultural aspects

Policies and practices in preschool education can be significantly influenced by culture. Cultural values and beliefs, for instance, may impact how parents prioritise their children's development and how they see early childhood education. Some cultures may greatly emphasise intellectual accomplishment, whereas social and emotional development may be more important.

12.4.2 Social aspects

Social variables, including poverty, inequality and urbanisation, can have a significant influence on preschool education policies and practices. For instance, children from low-income households may have restricted access to high-quality preschool education, which might expand the achievement gap between children from various socioeconomic backgrounds.

12.4.3 Economic aspects

Economic aspects of preschool education policies and practices can also be influenced by financing and resource availability. For instance, access to excellent preschool programmes may be hampered by financial constraints. On the other hand, a shortage of resources may affect the curriculum's quality, the teacher-to-student ratio and the physical setting [58].

Finally, factors related to culture, society and the economy can greatly impact preschool policies and practices. The creation of inclusive and equitable preschool education programmes that address the needs of all children is something that policymakers, educators and other stakeholders must work towards.

13. Discussion

Perspectives on preschool education and care emphasise the need to give young children a quality education while considering their individual variations and

developmental requirements. Preschool education models, ideologies and practices were explored, focusing on play-based learning, the responsibilities of teachers and carers and family engagement. The discussion included quality standards, possibilities and difficulties in delivering preschool education, including concerns with funding and access. The presentation of new trends and research on topics like the usage of technology and the contribution of preschool to bridging the achievement gap was also made.

These findings have implications for policymakers, educators and carers, including prioritising preschool education quality and considering cultural, social and economic issues that influence policies and practices. The impact of restrictions, such as financial limitations and lack of educational access, may make providing quality preschool education and care more difficult, especially for marginalised communities.

Practical ideas include expanding preschool funding and ensuring all children access high-quality programmes. The quality of preschool education may also be improved by encouraging family engagement and supporting teacher/caregiver training and professional development. Through enhanced policies and practises that are guided by continuing research and evaluation of preschool education initiatives, the needs of young children and their families may be better fulfilled.

14. Conclusion and recommendations

Preschool education and care are viewed from various angles, touching on some subjects like historical perspectives, preschool education models, philosophies and methods, curriculum and assessment, teacher and carer roles, family involvement, quality standards, challenges and opportunities and future directions. Early childhood education and care greatly influence young children's social, cognitive and emotional development. Improved academic and social-emotional outcomes for children are among the advantages of high-quality preschool education and care. Nonetheless, there are obstacles to excellent preschool education and care, such as a lack of financing, access and possibilities. Future directions include new developments and research in early childhood education and care, such as the application of technology in the classroom and the contribution of preschool to reducing performance gaps. Fostering an atmosphere that promotes play-based education and family engagement is essential to delivering high-quality preschool education and care.

Acknowledgements

The knowledge gained would not have materialised if my supervisor, Professor Dipane Joseph Hlalele (Department of Educational Psychology, University of KwaZulu-Natal, South Africa), had not taught me well to benefit from what I am practising. I thank the following in academia: Dr. John Appiah (University of Cape Coast, Ghana), Dr. Francis Raymond Ackah-Jnr (Griffiths University, Australia) and Dr. Blanche H Ndlovu (University of Free State, South Africa). The staff of the College of Distance Education, University of Cape Coast, Mampong Centre, Ghana), Staff of Mampong Municipal Education Office, Mampong – Ashanti, Ghana) and Mr. Gabriel Antwi (Regional Director of Education, Sunyani, Ghana).

Funding

This work did not attract any funding.

Conflict of interest

No conflict of interest is associated with the text.

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Chapter 12

Integration of Motor, Cognitive, Nutritional, Metabolic, and Epigenetic Influence Variables Related to Early Childhood as a Tool to Promote Child Development at Kindergarten Schools

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Abstract

Child development comprises interdependent dimensions which embrace physiological adjustments to disturbances caused by epigenetic modulations of genes in response to physical and social environmental influences, which, in turn, shape the health of children during their development, and reflect on their learning, behavior, and physical and mental well-being through their life span. It is a dynamic process in which children turns from a totally dependent on their caregiver to a human being who responds to one who perceptions in a planned, organized, and independent way. Promoting the conditions for a children's healthy development depends on knowing how it manifests in different aspects through their development. In the present work, cognition, motricity, nutrition, metabolism, and epigenetics during child development were studied in an integrative and multidisciplinary manner based on the last 40 years of research on child development; with the use of sensitive periods as parameters, whose plasticity is greater than in any other period in life, and which is translated into windows of opportunity for healthy interventions to suggest stimuli according to a specific milestone, democratizing such knowledge, thus making it accessible and functional to parents, teachers, and caregivers of children from zero to 6 years of age.

Keywords: child development, nutrition, motor development, cognition, epigenetics, childhood, education

1. Introduction

As a teacher in high school education, my intent to find answers to my questions about behavior and learning difficulties my students used to have made me think

about the failure I was experiencing trying to help them. What was missing in my approach? As a biologist, I know that an individual has his genes, the environment can regulate their expression, and the development of each living being has a unique complexity. Then I realized that if I wanted to help my students, I would need to research beyond the answers in the classroom. It was when I began to study more deeply how learning development occurs in humans, including in a comparative aspect, which revealed to me the complexity of the process. Sharing my experiences with a great friend, who also investigated education for a longer time, together with a team, we developed a material in order to experience another way of teaching and learning in the classroom. Working with that material with my students in high school, in some aspects, such as the movements, I observed surprising changes in students that presented learning difficulties because they developed the pleasure to learn and discover. This experience was replicated in public schools in Monteiro Lobato city, in middle school, with equally surprising results. These experiments were carried out in 2007 in high school and in 2011 in middle school and published in an article in 2014 [1].

Continuing with our studies, we decided to investigate more about childhood: how far things I observed in students in high school would be the result of experiences up to 6 years of age? We agreed that I would research the physiological aspects of development. That is when I organized the knowledge about child development in Physiology, under nutrition, cognition, motricity, metabolism, and epigenetics, produced in academic institutions, in order to process all this knowledge into a language easy enough to people not belonging to these institutions could understand it, even those who knew a little about child development. After all, a child's development depends mainly on the environment that adults around him offer him.

2. Physiology under an integrated approach of systems and definitions

A living system is an open, self-organized system in which there is a continuous exchange of matter and energy with the environment so that life persists. A complex interdependent system that floats and oscillates within limits controls the internal state of plasticity and flexibility. In an attempt to understand this complex system, the biological sciences adopted Descartes' metaphor, which places the functioning of the world as a machine. Over time, this metaphor has been replaced as a truth, simplifying a complex question and dividing it into parts that add up when they are interconnected, forming a whole greater than the sum of its parts. Studying a living system under this mechanistic reductionism limits its understanding, for there is no single obvious way to divide an organism into organs that are appropriate for a causal analysis of different functions: The organism is a nexus of a large number of weakly determined forces, none is dominant. The separation of causes and effects becomes problematic because organic processes have a historical contingency that hinders universal and generalist explanations [2]. The actions and events that occur since the emergence of the individual are cumulative and influence throughout life: in the way they self-organize, grow, develop, adapt, reproduce, repair, and maintain form and function, age, and die.

Development, in the context of this work, is considered as an unfolding of something already present and somehow pre-formed: The ontogeny of an organism is the consequence of a singular interaction between the genes that it carries, the temporal sequence of the external environments through which it passes during life

and random events of molecular interactions between the cells of the individual [2]. Studies, in both humans and animals, reveal that factors that act in early life influence energy balance in the long term [3]. One way to study this energy balance is by measuring the basal metabolism of individuals.

Basal metabolism is the energy expended by cellular and tissue processes to ensure the maintenance of life [4], which is different in adults and children. Basal metabolism in children is proportional to body mass rather than following the coefficient of 0.75 identified in adults. During childhood, basal metabolism mainly corresponds to the activities of the brain, liver, heart, and kidneys. In the newborn, for example, the contribution of the brain to basal metabolism is about 87%. During the first year of life is approximately 53 to 64%. In the case of chemical processes, such as protein synthesis and ion pumping, it is about 2/3 or more of basal metabolism. Significant changes occur in body mass composition during the first year of life. Therefore, the energy cost of growth varies during childhood [5]. When the proportions related to body mass composition stabilize at the end of early childhood (from 0 to 6 years), the basal metabolism coefficient is 0.75, as identified in adults. Before this point, preparing meals for a child is very different compared to an adult: Nutritional needs are very different and vary enormously during the first year according to the specific patterns of growth of the baby and the amount of motor stimulation. In addition, the baby performs various physiological adjustments, adjusts the immune system, and needs adequate nutrition to survive. The type and consistency of food change as the gastrointestinal system matures, becoming capable of metabolizing components and excreting metabolites from complex foods. The introduction of solid foods should occur parallel to the changes that occur in the development of the central nervous system during the first year, which provides a level of readiness for the baby to cope with foods of various textures, from liquid to soft [6]. In addition, human studies and animal experiments demonstrate the crucial role of nutrition in neuronal development: There is strong evidence that the diet of pregnant women, babies, and children has a long-term influence on cognitive development [7].

Considering as a general principle that the central nervous system is very vulnerable when it is developing rapidly, such a period known as a "growth spurt," nutrition has the greatest effect on brain development during the perinatal period, between the third trimester of pregnancy and the first months of a human baby's life. During this period of rapid growth, neural events occur according to a well-established schedule, so the effects of nutrition depend on when these events happen [8, 9]. Any change in the basic neuronal structure brought about by nutrition seems to have a long-term effect. Humans do not passively respond to environments in which they are: Cognitive processes affect environment choices and cognition is implicated in food choices [9]. Therefore, an adequate balance of energy and essential nutrients are dietary requirements for proper growth and development during childhood.

When cognitive development is disturbed, motor development is often affected. Motor development and cognitive development can be fundamentally interconnected and exhibit equally extended "development schedules" [8]. Motor development in children can be described as a dynamic process in which new forms of movement emerge from intrinsic processes and through interaction with the environment [10]. The assessment of a child's motor development has been considered one of the most important indicators of possible problems in neurological development [11]. Motor behavior involves more than performing muscle activity, joints, and strength. Adjustments in motor behavior to what the body needs about the environment require perception, planning, decision-making, learning, and discovery of new strategies.

Motor development comprises the development of the body, brain, and interaction with the environment [12].

Before moving forward, it is necessary to make a parenthesis to clarify some concepts used here that, sometimes, in many readings, are used as synonyms, such as adaptation and adjustment. According to Schmitd-Nielsen [4], the concept of adaptation refers to behavioral or genetic changes that occur in species over generations, while it adjusts to the changes that occur in the individual, i.e., a single generation adjusts itself to changes in the environment. Therefore, when the word adaptation is being used by authors as a synonym for adjustment, in this work, the term will be corrected into adjustment. The same was observed for the concepts of growth and development. This work follows the definitions given [13]: Growth refers to observable changes in quantity, that is, the increase in body size due to successive cell divisions; processes of change in the level of functioning of the individual as a consequence of their growth. For this reason, the term child development was chosen, not growth, because child development is the specialization of functions over the first 6 years of life.

3. Historical perspective of child development studies

3.1 Preformationism theory

For centuries, childhood was disregarded: Children were like miniatures of fully formed adults. According to Àries [14], people treated children like adults in the Middle Ages. When they were 6 or 7, children were taken to other villages to work as apprentices, wore the same clothes as adults, and went to taverns with their parents. Children under the age of 7 used to receive protection and care. However, people were indifferent to the stimuli provided to children in this age group, such as motor and speech development [14]. According to Ausubel & Sullivan [15], the fundamental thesis of preformationism denies the importance of development in human ontogeny. All characteristics, whether physical, motor, cognitive, or emotional, are pre-existing and pre-formed at birth.

The change in the preformationist view was gradual and began approximately in the 1500s when the world of work showed signs of change. With the invention of the mechanical press, the growth of trade and economic markets, and the emergence of cities and national states, new job opportunities began to emerge: merchants, lawyers, bankers, journalists, government officials, and occupations that required knowledge of reading, writing, and mathematics. Members of a growing middle class began to discredit that a person's place in society was predetermined by birth. They saw, in children, the possibility of ascending socially, providing their children with the necessary academic education for these new jobs. This new demand for education caused the number of schools in Europe to grow greatly in the sixteenth and seventeenth centuries [16]. The child, then, was no longer seen as a being prepared for the adult's world, but as someone who needed to be separated from this world to receive an education: The child was seen less as an adult and more as a future adult [14] but not as a child yet.

3.2 The importance of the first years of life

The first to highlight the importance of childhood care was John Locke (1632–1704). In his book "Some Concerns About Education," from 1693, the author points out that "the smallest or hardly felt an impression in our early childhood is paramount and

leaves consequences" [17]; and also highlights the care of the child, which "should be, not what a doctor should do with a sick and agitated child; but what parents, without the help of a doctor, could do to prevent possible diseases and maintain a healthy constitution of their children" [17]. For him, experience is where all knowledge is founded and from where we derive. The environment shapes the mind, and its influence [of the environment] is stronger in the first years of life, a period when one can mold the child for his whole life. According to Locke, many of our thoughts and feelings develop by association, behaviors, by repetition, and we learn by imitation and rewards and punishments. These three factors together would shape character [16, 17].

Although John Locke wrote a philosophy for education and its principles [16] and, in his book, dedicated itself to the physical care he should have with children in the early years, he did not distinguish the stages of child development.

3.3 Child development by stages

Jean Jacques Rousseau (1712–1778) was the first to describe child development as independent of the influences of the environment and as something that happened according to an internal, biological timeline in the eighteenth century. Children were not shaped only by external forces but also grew and learned a lot by themselves following a plan [16]. Rousseau suggested that development unfolded in a series of stages, periods in which the child experienced the world in different ways. That was the difference between a child and an adult: They were not blank canvases to be filled with the teachings of adults, but the patterns of thought and behavior of each child would have unique characteristics of each stage [16, 18]. For Rousseau [18], each child should be treated according to his stage. He also did not believe in the "power of the environment," especially the social environment, to form a healthy individual. According to Rousseau, instead of teaching the child to think "correctly," we should allow him to perfect his own abilities and learn by his own means, to rely on his own judgment power [16, 18].

A century after Rousseau, the British naturalist Charles Darwin (1809–1882), after his expedition to distant parts of the world aboard the Beagle, wrote the foundations of what would become the Theory of Evolution, with emphasis on the adaptive value of physical characteristics and behavior for the survival of the individual. During his exploration, Darwin discovered that the prenatal growth of many species was surprisingly similar. From this observation of Darwin, other researchers followed the same general plan for the evolution of the human species, carefully observing all aspects of the child's behavior, and conducting scientific studies on child development [19].

Influenced by the Theory of Evolution and studies in genetics, Arnold Gesell (1880–1961) was the pioneer in studies on biological maturation and the first to develop tests for child intelligence [16].

According to Gesell, maturation refers to the processes by which development is governed by intrinsic factors, mainly genes, which are chemicals contained in the nucleus of each cell. Genes determine the sequence, timing, and emergence of action patterns in conjunction with environmental factors. For this author, child development is influenced by two main forces: the environment, which would be the external force, and genes, which would be the internal force. For Gesell, babies come into the world with an internal clock, which is the product of 3 million years of biological evolution. Therefore, they are preeminently "wise" about their needs and what they are or are not ready to do. Gesell emphasized that the first year of life is the best time to learn about the child's individuality and that parents, despite an intuitive sensitivity to the child, needed some theoretical knowledge about child development [16, 20].

3.4 Sensitive periods (windows of opportunity)

In 1891, the term "sensitive periods" was first used by botanist Hugo De Vries (1848–1935) when describing a specific period when poppy flowers were sensitive to the external environment to the point of causing the modification of stamen (male structure of a flower) in the secondary pistil (female structure of a flower). According to De Vries, this sensitive period comprised the seed phase or the first weeks of life of the young plant [21]. Contemporary of De Vries, Maria Montessori (1870–1952), in her book "Il Secreto dell'Infanzia"1936, cites De Vries as the author of the term and uses it to determine the periods that are genetically programmed in time blocks during which the child is especially able to learn certain tasks very well. For example, there are periods for the development of language and the beginning of the use of hands [22]. The concept of "sensitive periods" is a central component of child development for Montessori [16]. According to the author, if the child is prevented from enjoying the experiences at the time when nature planned for him, the "special sensitivity that draws" will disappear, having a disturbing effect on development [23].

Studies conducted on fish embryos in the early twentieth century showed that there were critical periods when interference with the embryonic development of these animals, such as food deprivation, would have "more serious results" than in any other period [24]. Stockard [24] does not explain the term "critical period" *per se*, but is the first to use it in a scientific work to explain periods in the development of a species in which interventions would be more or less determinant in the development of the individual and that the processes of maturation in different parts would happen at different rates. This concept was adopted by neurobiology, whose research revealed that different regions of the nervous system of children matured in different periods [25]. The effect of a given stimulus (or experience) on development depends on when it occurs during that development, and in most cases, there is a window of opportunity in which a particular stimulus can influence it. If a certain stimulus must happen at a particular interval of development, this interval is called a "critical period." However, when a particular stimulus needs to occur at a certain interval, but still influences, even if more leniently, outside that interval, that larger interval is called the "sensitive period." Although the term "critical period" is more used, most of the effects of stimuli occur in sensitive periods [26].

The concept behind this term is that certain windows are opened to the effect of external experiences, from birth, closing one by one, with increasing age, because of the decline of the plasticity of the brain. There are windows to the development of motor control, vision, feelings, and language. In theory, if the child loses an opportunity, he can no longer develop the neuronal circuit with all its potential for a specific function [13], as described by Montessori. This is because if a neuronal circuit, once formed, is not used, it can be lost and not work properly—it is the principle of "use it or lose it." One of the advantages of human brain development taking a long time is that many stimulation opportunities and experiences can be promoted to enable fine-tuning of development [26].

3.5 Epigenetics and critical periods

According to the Origin of Development hypothesis, during critical developmental periods (prenatal and postnatal mammals), nutrition and other

environmental stimuli influence the pathways through which development will follow. Numerous studies show an association between low birth weight and the incidence of cardiovascular disease, hypertension, type 2 diabetes, and deficiencies in insulin metabolism and serum cholesterol concentrations in adults. From the point of view of epigenetics (the study of heritable traits that are not associated with changes in the sequence of nucleotides – which form genes, the basic physical and functional unit of heredity – but with chemical changes in DNA, which is made up by genes, or regulatory and structural proteins that are linked to it [27, 28]), child development could be defined as "carved experiences into DNA of an organism through one of the main epigenetic mechanisms of change: methylation." DNA methylation corresponds to the chemical transfer of a methyl group to a CpG sequence (cytosine-phosphate-guanine) in one of the DNA strands. This mechanism is generally related to gene silencing, whether of paternal or maternal origin, during embryogenesis, as well as after birth [29–31]. The DNA methylation machinery sets the standards during development and possibly during adulthood in response to new signals from the environment, which are renewed when the genome is duplicated in mitosis [32–36]. Therefore, child development could be defined as a dynamic interaction between the environment and the child and mediated by a series of epigenetic modifications of specific genes that would result in physiological, stable, and persistent cognitive, emotional, and behavioral. Fraga and collaborators [37], studying monozygotic twins, discovered substantial epigenetic differences between them. According to van Ijzendoorn and collaborators [30], this was possible because identical twins were exposed to different environments and, because of this, would no longer be identical. Many studies suggest that childhood trauma may induce depression, anxiety, and post-traumatic stress response by epigenetic regulation of the hypothalamic-pituitary-adrenal axis, which is responsible for stress response [38]. Epigenetic changes would be the molecular mechanism by which the environment would affect the physiology and behavior of a developing child, and development would incorporate environmentally induced signatures into the epigenome [30, 37], whose modifications could be transmitted throughout generations. Heijmans and collaborators [39], studying individuals who were exposed to famine during Dutch Hunger Winter in 1944–1945, showed that those individuals, 6 decades later, had less DNA methylation of the imprinted gene IGF-2 (related to insulin response to glucose so to overweight, obesity, and type 2 diabetes [40]), compared to their same-sex unexposed siblings. Early-life environmental conditions can contribute to epigenetic modifications that affect the individuals throughout their life and their next generation.

4. The importance of an integrative approach of child development

Considering development as an unfolding of something already present and somehow preformed, the ontogeny of an organism is the consequence of a singular interaction between the genes it carries, the temporal sequence of the external environments through which it passes during life, and random events of molecular interactions between the cells of the individual [2]. Studies, both in humans and in other animals, reveal that factors that act in early life influence the long-term energy balance [3]. Nutritional physiology often undergoes programmed changes throughout development as individuals mature from birth

to adulthood [41]. Considering human beings, movements depend on biological and psychological environments as on conditions of the environment where they live and are built throughout their lives [42], which is no different for any other animal. Therefore, the first years of life are essential for the foundation of later development: The young and the adult are the result of the quality of care they had in childhood.

Child development includes interdependent dimensions that encompass social, emotional, cognitive, psychomotor and patterns of behavior, and nutrition [43]. According to Fonseca [44], for Piaget, all cognitive mechanisms are based on and emerge from the development of motor skills, which occurs in early childhood (from 0 to 6 years of age). Fonseca [44] states that psychomotricity helps the child to acquire sensations, perceptions, and concepts that will allow him to know his own body and, from it, the world around him. Ivanovic and collaborators [45] found that the differences in IQ among Chilean high school students were mainly due to malnutrition in childhood. According to Cadavid Castro [46], it is increasingly clear that the quantity and quality of nutrients received by the child are directly related to their cognitive potential and their mental and emotional health, in addition to reflecting on adult brain functions and their eventual decline with age. Childhood is the crucial phase in which many health-related behaviors are shaped [47], and a child does not choose the environment in which he lives, much less has the skill and knowledge necessary to choose a diet or exercise. According to the World Health Organization, only 3% of cases of type 2 diabetes and obesity were observed in children in the United States in the mid-1970s [43]. Currently, this proportion reaches 45% of cases, with alarming rates in other countries, including Brazil. Children depend on their parents to have a healthy childhood: Parents who know which nutritional and psychomotor factors are important to a child can educate them to be active, with full development of their cognitive and motor abilities. In the future, this child will be able to choose his own path, such as dedicating himself to sports or "books," for example, and not simply exclude one for not feeling able to perform the other [48].

The passage from a limited motor repertoire of the newborn to complex motor skills and manipulation of the child is among the most dramatic and visible transformations in the human life cycle. Because of this, many researchers believed that these transitions could promote a model of understanding the development of higher cognitive functions or even be underlying higher functions [49].

However, the scenario for the promotion of child development around the world is far from the best: At least 200 million children under the age of five cannot develop their cognitive and socio-emotional potential, basically because of nutritional deficiencies, malnutrition, and inadequate stimuli in the first years of life. Each of these related factors leads to a determining effect on the development of the child. But when two or more of these factors are found together, the combined impact of the factors is even more severe [50]. Understanding how all these factors are interrelated (cognition, motricity, nutrition, metabolism, and factors of epigenetic influence) can contribute to the further understanding of the complexity of human development, which is far beyond studying each phase or each aspect separately, but first of all in knowing how each factor interacts with each other throughout life [51–54]. We have a big problem ahead of us. The kind of problem is defined and, along with it, the seriousness of its long-term consequences. A response is needed from the world and from us [50].

5. Contributions to pedagogical practices with children from 0 to 6 years of age

Nutrition in the early years of life can affect cognitive performance in later ages [7, 55]. The rapid growth of the brain during the last 3 months of gestation and 2 years of life makes it a vulnerable organ to dietary inadequacies during the first years of life and may create future cognitive and motor problems. In addition, micronutrients are essential for metabolism and, in particular, cell division and tissue growth, such as nervous, muscular, and skeletal [56]. A child with learning or motor difficulties does not necessarily suffer from cognitive problems—they can be of a nutritional order [45], as shown in **Table 1**. It is necessary to provide the child with the correct food, in the necessary quantities, respecting its development, including the digestive system and the microbiota, whose development is completed around 4 years of age [113]. Therefore, it is paramount that the child receives adequate nutrition. It means receiving the correct amount of nutrients in the required period of development, both at home and at school.

In addition to nutrition, creating a stimulating environment for development is also important to actively engage the child's mind to strengthen his neuronal network [114]. The play offers broad physical, emotional, cognitive, and social benefits, as it allows: (i) the development of motor skills, communication, creativity and problem-solving, social competence, and resilience; (ii) promotes alternative scenarios for the experience of their social repertoire; and (iii) signals for positive and negative behaviors resulting from the child's development process. Free play is of vital importance for healthy childhood development recognized by the United Nations as a fundamental right of the child [115]. However, many of them do not receive the benefits of play in its fullness, either because they are pressured by the accelerated lifestyle of parents or because they live in socially vulnerable communities, which interfere directly with academic performance, socialization with other children, and in her relationship with her parents [116].

Detailed knowledge of the mechanisms that control sensitive periods and plasticity, which, in turn, happen during sensitive periods, provides the basis for the development of procedures to help minimize the long-term effects of harmful experiences during early childhood and maximizes the acquisition of motor and cognitive functions once appropriate conditions are restored. Such knowledge can also lead to more effective methods for educating a child so that he can take advantage of the full potential that the nervous system can offer so that the child can learn from his own experiences [117].

The children who come to school are the result of the stimuli they have received so far. An unsatisfactory performance in any activity should not be treated in a simplified way, because several factors are involved in this result and may be signaling other aspects that need to be worked on than academics. Child development is multidisciplinary. Therefore, the approach to poor performance should also be multidisciplinary. In addition, child development depends not only on the maturation of the brain but also on the interactions between the child and the environment around him. Because of this, the observed development results of different children can vary substantially. Learning about the development sequences and the context in which it needs to happen is necessary for understanding possible problems in development to thus plan effective interventions [118]. It is important to plan interventions appropriate to the period of development in which the child is, providing the necessary stimuli so that he can achieve the skills provided for his/her age, instead of being classified based on his/her disabilities. These interventions are simple, as shown in **Table 2**, where the minimum stimuli required for each age group from 0 to 6 years old are placed.

Nutrient	Function	Behavior	References
Calcium	Bone formation; absorption of iron.	Motor and learning difficulties; passivity; apathy.	[57–63]
Iron	Hemoglobin formation (oxygen transportation).	Anemia; pallor; weakness; apathy; learning difficulties; attention deficit; tiredness.	[62, 64–69]
Iodine	Formation of thyroid hormones	Mental retardation; learning difficulties; impairment of physical development.	[70–74]
Zinc	Immunity; iron absorption; memory.	Low immunity; growth retardation; tiredness; weakness; learning difficulties.	[75–80]
Vitamin A	Formation of pigments of vision; memory (plasticity of the hippocampus); protection of nerve cells against free radicals; immunity.	Learning difficulties; low immunity.	[81–87]
Vitamin D	Calcium absorption by bones; immunity.	Rickets; motor difficulties; learning difficulties; apathy; sadness; low immunity.	[71, 88, 89]
Vitamin E	Antioxidant; cell division; immunity.	Motor difficulties (muscle pain), weakness; learning difficulties.	[71, 90]
Vitamin K	Blood coagulation; regulation of calcium in bones.	Motor difficulties; bruises that appear easily and long-lasting.	[91]
Vitamin C	Antioxidant; iron absorption; immunity.	Weakness; fatigue; apathy; low immunity.	[92–96]
Thiamine	Facilitates the use of glucose by the brain.	Learning difficulties (abstract thinking); irritability.	[82, 97–99]
Niacin and pyridoxin	Metabolism of amino acids; release of glucose in the muscle; modulation of steroid hormones.	Weakness; irritability; nervousness; difficulty sleeping; motor difficulties.	[82, 91, 100–102]
Riboflavin	Cellular respiration; intermediate metabolism; iron absorption.	Inflammation of the mouth; thrush; blowtorch.	[71, 102, 103]
Folic acid	Iron absorption; amino acid synthesis.	Anemia; dermatitis; weakness; depression; learning and socialization difficulties.	[91, 103, 104]
Cobalamin (B_{12})	Cellular respiration; synthesis of some amino acids.	Anemia; demyelination; learning difficulties; attention deficit.	[71, 91, 102, 105]
Coline	Cell membrane formation; water balance; immunity.	Liver problems; muscle damage; motor difficulties.	[105]
Proteins	Formation of enzymes and muscle proteins.	Motor difficulties; tiredness, apathy; learning difficulties; attention deficit.	[71, 106]
PUFAs	Formation of the cell membrane; part of various hormones; myelination; immunity.	Learning difficulties; attention deficit; irritability; hormonal disorders; low immunity.	[107–112]

For each nutrient in the table, behaviors can be observed when one of them is deficient. The functions and respective bibliography are also described.

Table 1.
Observable behaviors in children with some nutritional deficiency.

Age	Nutrition	Cognition	Motricity
0–2 m.o.	Breastfeeding	Speak articulately to 20 cm from the baby, look into the eyes, and touch the baby. (He/she knows the very existence from the interaction with the other).	Move the baby (Reflex movements).
3–6 m.o.	Breastfeeding	Talk articulately, look into the eyes, touch the baby, give him/her objects, assemble stimulating environments, play "peek-a-boo." (He/she knows the very existence from the interaction with the other and with the environment).	Move the baby, hold it vertically, and leave objects for the baby to pick up. (Reflex and voluntary movements).
6–12 m.o.	Breastfeeding, Baby lead weaning (BLW), no sugar.	Talk articulately, look into the eyes, touch the baby, give him/her objects, read to the baby, and set up stimulating environments. (He/she knows the very existence from the interaction with the other and with the environment).	Hold him/her vertically, leave distant objects for the baby to pick up, mount an obstacle (Reflex and voluntary movements).
12–18 m.o.	Solid foods, no sugar.	Talk, speak at eye level, hug, praise, and allow his/her to explore the environment. (He/she is knowing how the environment works).	Leave distant objects for the child to pick up, encourage him/her to walk, mount obstacles, and provide boxes and objects of various sizes. (Voluntary movements and balance).
18–24 m.o.	Solid foods, no sugar.	Talk, speak at eye level, hug, praise, allow him to explore the environment, create safe situations to him/her to say "no". (He/she is understanding how it himself/herself works in the environment).	Ask to pick up objects, encourage him/her to walk faster and climb, provide boxes and objects of various sizes, and throw ball. (Balance, motor coordination).
2 y.o.	Eat as same items as an adult	Talk, speak at eye level, hug, praise, allow her to explore the environment, go to different places, leave her with other children, and help him/her cope with frustration. (He/ she is understanding the rules of the environment).	Ask to pick up objects, encourage him/her to walk faster and climb, provide boxes and objects of various sizes, throw the ball, and let him/her eat alone. (Balance, motor coordination).
3 y.o.	Eat same items as an adult	Talk, speak at eye level, hug, praise, allow him/her to explore the environment, go to different places, leave him/her with other children, give space for autonomy, help him/her understand his/her feelings. FREE PLAY. (He/she is understanding the existence of the other).	Ask to pick up objects, encourage him/her to run and climb, play ball, jump rope, provide boxes and objects of various sizes, and assemble a sensory mural. FREE PLAY. (Balance, motor coordination).
4 y.o.	Eat as same items as an adult	Talk, speak at eye level, hug, praise, allow her to explore the environment, go to different places, leave her with other children, give space for autonomy, and ask him/her to tell stories. FREE PLAY. (He/she is understanding the existence of space x time).	Ask to help with tasks, encourage him/her to run, climb, play ball, jump rope, provide boxes and objects of various sizes, assemble a sensory wall and obstacles, calm him down when he/she wets the bed. FREE PLAY. (Balance, motor enhancement).

Age	Nutrition	Cognition	Motricity
5 y.o.	Eat as same items as an adult	Talk, speak at eye level, hug, praise, allow her to explore the environment, go to different places, leave him/her with other children, give him/her space for autonomy and to help, ask him/her to tell stories and draw how you feel. FREE PLAY. (He/she is understanding how to be in the world).	Ask to help with tasks, encourage him/her to run and climb, play ball, jump rope, provide boxes and objects of various sizes, and assemble a sensory wall and obstacles. FREE PLAY. (Balance, motor enhancement).
6 y.o.	Eat as same items as an adult	Talk, speak at eye level, hug, praise, allow him/her to explore the environment, go to different places, leave him/her with other children, give him/her space for autonomy, ask him/her to tell stories and draw how he/she feels, give him/her problems to solve, and ask him/her for help. FREE PLAY. (He/she is understanding how to act in the world).	Ask to help with tasks, encourage him to run, climb, play ball, and jump rope, provide boxes and objects of various sizes, and mount obstacles and challenges. FREE PLAY. (Motor improvement and independence).

Table 2.
Basic nutritional, cognitive, and motor stimuli needed to provide a healthy environment to child development from 0 to 6 years old.

6. Discussion and conclusions

Child development unfolds along individual paths whose continuous and discontinuous trajectories, as well as a series of significant transitions are shaped by the interrelation between the different vulnerabilities and resilience. The moment when these changes occur is very important: Child development is liable to risks and open to protective measures that influence not only the first years of life but also adulthood. What happens during the first years of life is extremely important, not only because it promotes an indelible mark on the well-being of the adult, but also because it determines how robust or fragile the subsequent stages will be [119]. It is also necessary to consider that there is great variability in children's behaviors—each one is unique—because both genetic factors and the influence of the environment interact to give rise to the individual organism. The basic patterns are determined by heredity, but the genetic determinants are expressed through interactions with various aspects of the environment: The environment provides the energy, substance, and environment to unfold the potentialities of the individual—no individual develops in a vacuum. Stimuli offered to a child have broad consequences on the behavior and physiology of this adult [120]. Variations in the behavior of the mother, for example, directly influence epigenetic processes, in which genes "turn on and off" according to signs of the environment in critical periods of development, impacting the social environment, considering that the genome acts in the transmission of individual differences in response to stress [121]. Democratizing academic knowledge about child development in the form of a tool that can be used by educators, childhood professionals, and parents would be a way to create the conditions for those who work with early childhood, to have the necessary knowledge to provide the appropriate stimuli and environment to provide the child with healthy and full development, or in time to intervene to remedy the problems that will potentially result in difficulties in later stages of the child's life [122].

Promoting the conditions for the development of the child to occur in a healthy way depends on knowing how it manifests itself in different aspects throughout child development [20, 118, 123]. Paraphrasing Gesell and Gesell, we need to conserve the best in childhood if we want to save to the world the best in youth [20].

Acknowledgements

I am grateful to Pedro Gandolla for helping me to understand how to help my students, José Eduardo Pereira Wilken Bicudo for supervising me in my Ph.D., José Guilherme Chauí-Berlinck for supporting me in the laboratory, and Bioscience Institute of University of Sao Paulo to provide the conditions to accomplish this research.

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Chapter 13

Exploring Instructional and Interactional Aspects of Process Quality in Preschools and Teachers' Perceptions of Professional Development

Runke Huang

Abstract

Teaching is a complex and multifaceted endeavor that involves the interplay of various dimensions. In light of this, the present study seeks to integrate instructional and interactional aspects to conceptualize process quality and explore it within preschool settings. A total of 96 classrooms underwent quality evaluation using the Early Childhood Environment Rating Scale – Extension (ECERS-E) and Sustained Shared Thinking and Emotional Well-being Scale (SSTEW) scales, and 11 teachers were randomly selected for interviews to gain insights into their perceptions of teaching practices and professional development needs. The findings indicate that teachers exhibited inadequate to minimal quality in both instruction and interaction, they faced challenges in implementing science activities, adopting child-centred approaches, providing scaffolding and conducting child assessments. Furthermore, teachers expressed a need for professional development programmes that are practice-oriented, provide opportunities for discussions and include hands-on activities. These findings provide valuable insights for the design and targeting of future professional development programmes aimed at improving process quality in preschool settings.

Keywords: process quality, instruction, teacher-child interaction, preschool education, professional development

1. Introduction

Over the past decades, policymakers, researchers, school managers and practitioners all shared the concern of enhancing the process quality of early childhood education and care (ECEC) which is the key to support children's learning and development [1–3]. To improve the quality of children's classroom experience, the Ministry of Education in China has initiated an educational reform and released the Teaching Guidelines for Kindergarten Education (2001). It aims to introduce progressive

educational ideas and promote child-centred and developmentally appropriate practice [4], regardless of traditional Chinese culture which features collectivism and children's obedience. Moreover, how Chinese teachers deliver interactions during instruction, what is the quality of teachers' teaching practice and their professional development needs after the revolution remain little known. A serious disparity between centralized policies and early childhood practitioners' pedagogical practices deserves more empirical investigations. To fulfill the knowledge gap, this study will investigate teachers' pedagogical practice and their perceptions of professional development in Chinese kindergartens.

2. Instruction and interactional aspects of process quality

Decades of researchers have obtained a consensus that process quality has a direct impact on child outcomes [5, 6]. Instructional and interactional aspects of process quality have been discussed and studied to explore how process quality influences child outcomes. The instructional aspect of process quality is domain-specific, which captures the extent and quality of the promotion and stimulation of early learning in various domains, such as early numeracy or literacy skills [7]. For example, the Early Childhood Environment Rating Scale – Extension (ECERS-E) [8] was developed to measure the instruction quality in literacy, numeracy, science and diversity. The Instructional Quality Assessment (IQA) Mathematics Toolkit captures mathematic teachers' pedagogical practice and students' engagement in mathematical discourses during discussion [9]. This perspective is attributed to teachers' domain-specific or subject-matter knowledge. Research that includes comprehensive assessments of teachers' educational backgrounds and their coursework in specific subjects indicates that, particularly in the fields of mathematics and science, the level of teachers' academic preparation has a positive impact on students' academic performance [10].

In addition, the interactional aspect of process quality focuses on child interactions with teachers as well as with material and learning environment, which is often evaluated using the widely recognized and commonly employed Classroom Assessment Scoring System [11] (CLASS) and Sustained Shared Thinking and Emotional Well-being [12] (SSTEW) scales. The CLASS evaluates teacher-child interaction across three dimensions: emotional support, classroom organization, and instructional support. Emotional support focuses on nurturing a positive and caring relationship between teachers and children. Classroom organization primarily examines the proactive behavior management strategies employed by teachers to enhance student involvement in learning and play. Instructional support pertains to how effectively teachers promote children's higher-order thinking skills and language abilities through classroom instructional activities. Similarly, SSTEW measures the interaction quality in building trust, confidence and independence, supporting children's social and emotional well-being, extending children's language and communications, supporting learning and critical thinking, assessing learning and language [12]. The interactional aspect of process quality focuses on teachers' pedagogical knowledge which is characterized as the distinct proficiency educators exhibit in constructing and fostering efficacious teaching and learning environments, and a skill applicable to all students and transcending individual subject domains [13].

The dimensions of process quality have consistently been shown to play a vital role in shaping children's cognitive and social-emotional development. For instance, a study conducted by Sylva et al. [8] examined a sample of 2857 children from 141 early

childhood settings in the UK and found that higher average scores on the ECERS-E were indicative of better pre-reading skills in children. Similarly, Howard et al. [2] discovered a positive association between scores on the ECERS-E and SSTEW and children's number concepts and early numeracy development in Australia. To enhance process quality in early childhood education and care (ECEC), the current research emphasizes the significance of implementing effective professional development (PD) programmes. These programmes provide educators with valuable theoretical knowledge, content expertise and alternative instructional methods that challenge their existing beliefs and foster continuous improvement [14].

Professional development in ECEC refers to purposeful and interactive learning experiences designed to enhance educators' professional knowledge, skills, and attitudes and their application in practice [15]. In the ECEC field, various in-service training opportunities, such as coaching, consultation, mentoring and communities of practice, are provided to improve teaching practices and enhance children's learning outcomes [15, 16]. For example, [17] Early et al.'s (2017) randomised controlled trial (RCT) demonstrated that the Making the Most of Classroom Interaction (MMCI) and MyTeachingPartner PD programmes significantly enhance teachers' emotional and instructional support for children. Furthermore, research suggests that engaging in multiple coaching cycles leads to improved instructional support [18]. Despite the availability of various PD programmes for preschool teachers, there is a lack of research exploring teachers' perceptions of these programmes and their specific PD needs. Therefore, this study aims to evaluate teachers' instructional and interactional performance through a combination of quality evaluation and interviews. Additionally, it seeks to explore teachers' PD experiences and examine their perceptions of the effects of these PD programmes, providing valuable insights for future research on the professional development of preschool teachers.

3. Process quality in Chinese early childhood settings

Kindergartens in China serve as the primary institutions for early childhood education (ECE), catering to children between the ages of 3 and 6. The establishment of the first Chinese kindergarten dates back to 1903, marking the beginning of a long history of early childhood education in China that has seen influences from Japanese schooling systems, Soviet approaches, and American pedagogy [19]. Consequently, cultural inappropriateness has persisted in teaching process. Prior to the introduction of progressive educational philosophy, Chinese kindergarten teachers were formally required to employ whole-class, teacher-directed, and academically oriented pedagogy [4]. This approach neglected children's active learning and interactions with teachers, as traditional pedagogy rooted in Confucian principles emphasized conformity, discipline, and behavioral control among children [20].

In recent times, a promising period of transformation has emerged with the aim of replacing traditional pedagogy with developmentally appropriate practices. This shift is supported by the new Guideline for Kindergarten Curriculum, which advises Chinese kindergarten teachers to adopt pedagogical approaches that are play-based, child-centred, and constructive [21]. However, certain distinctive features still persist in kindergarten classrooms, such as teacher-directed instruction, whole-class teaching, larger class sizes, and structured daily routines [20]. Whole-class teaching continues to dominate kindergarten classrooms, resulting in pedagogical interactions

characterised by frequent teacher questions and simple oral responses from the entire class, or teachers delivering direct instruction while children sit quietly and attentively listen [20].

Previous research has predominantly described the characteristics of teacher-child interaction, with limited attention given to the quality of pedagogical interactions. Only Hu and colleagues (2016) [21] utilised the CLASS to assess such interactions. In their study of 180 classrooms, they found that Chinese kindergarten teachers demonstrated low levels of instructional support, receiving an average score of 3 on the 7-point scale. This can be attributed to the prevalent use of whole-class teaching methods in Chinese kindergartens, with limited instances of one-to-one or small-group interactions. When considering the Chinese socio-context, including factors like overcrowded classrooms and larger class sizes, the SSTEW scale, which evaluates both instructional form and teacher-group interactions, is suitable for the Chinese context, providing a more comprehensive understanding of interaction quality in Chinese kindergartens. Additionally, the ECERS-E, which examines teachers' instructional practices across different learning domains, is also relevant to Chinese classrooms where teachers provide domain-specific activities. Based on the literature review and within the Chinese context, this research aims to explore the characteristics of process quality in Chinese kindergartens, as guided by the following questions:

1. What is the process quality of early childhood settings in China?

2. What are teachers' perceptions of their teaching practice and their professional development needs?

4. Method

In this study, quantitative and qualitative approaches were employed to investigate the characteristics of process quality and teachers' perceptions of professional development in Chinese kindergartens. More specifically, classroom observations were conducted to measure the process quality. Semi-structured teacher interviews were conducted to discern their perspectives towards pedagogical practice and perceptions of professional development.

4.1 Participants

The research was carried out in Shenzhen, China. A stratified random sampling method was utilised to choose 24 kindergartens distributed across socio-economically diverse regions (lower-middle, middle, and upper-middle areas). From each kindergarten, two K1 and two K2 classrooms (catering to children aged 3–4 and 4–5 years, respectively) were randomly selected, summing up to 96 classrooms. Subsequent to determining the participating kindergartens and classrooms, 11 teachers were randomly chosen from the participating kindergartens for an interview. The demographic information of the participating classrooms is presented in **Table 1**.

4.2 Measures

Early Childhood Environment Rating Scale – Extension (ECERS-E) [22]. The ECERS-E was developed by Sylva et al. [22] in the longitudinal Effective Pre-school,

Classroom characteristics	**Total N = 96**
Grade, n (%)	
K1	48 (50)
K2	48 (50)
School type, n (%)	
Private	44 (45.83)
Public	52 (54.17)
School classification, n (%)	
Province level	32 (33.33)
City level	36 (37.50)
District level	28 (29.17)
School location, n (%)	
Urban	48 (50)
Sub-urban	48 (50)

Table 1.
Demographic information of participating classrooms.

Primary and Secondary Education (EPPSE) project. This measure aims to estimate the instruction quality including literacy, numeracy, science and diversity which was used to describe the children's development process. It includes 18 items grouped into four subscales. The scores for each item range from 1 (indicating inadequate quality), 3 (indicating minimal quality), 5 (indicating good quality), to 7 (indicating excellent quality) based on the indicators. It has shown good reliability (Cronbach's α = 0.83–0.97, [22]) and good validity (CMIN/DF = 1.102, CFI = 0.939, RMSEA = 0.034, and TLI = 0.919) in Chinese preschools [13].

Sustained Shared Thinking and Emotional Well-being Scale (SSTEW). Furthermore, trained classroom observers used SSTEW [12] to measure teachers' pedagogical practice which supports children's sustained shared thinking and emotional well-being. This scale was developed by Siraj et al. (2005) and it consists of 14 elements rated from 1 (inadequate) to 7 (excellent) and focuses on teachers' practice in (1) building trust, confidence, and independence; (2) social and emotional well-being; (3) supporting and extending language and communication; (4) supporting learning and critical thinking; and (5) assessing learning and language. It has shown good validity (CMIN/DF = 1.042, CFI = 0.977, RMSEA = 0.070, and TLI = 0.970) in Chinese preschools [13].

Interview protocol. The interview protocol was developed to elicit participating teachers' reflections on their teaching practice and their professional development needs. This protocol comprises two parts and a total of 10 questions. The first part of the interview explores the challenges that the teachers face in their daily teaching practice (e.g., what kind of difficulties have you met in daily teaching?). The second part of the interview seeks to understand the teachers' prior PD experiences and their perceived PD needs (e.g., what type of PD programmes have you ever participated in?). Semi-structured interviews were conducted with 11 participating teachers after observing their pedagogical activities. Each interview lasted around 45 min and was recorded and transcribed for analysis.

4.3 Procedure

The quality evaluation was conducted by a team of four researchers, each holding a master's degree in early childhood education or a related field. Prior to initiating the evaluation process, consent was obtained from both educators and parents through official consent forms. The lead researcher established pairs among the three other researchers who proceeded to jointly conduct classroom observations and evaluations. This process was continued until they achieved a minimum 80% agreement in item-level scores. Throughout, the scoring alignment was regularly monitored, with any discrepancies discussed post-observation and post-quality rating to reach a consensus on all evaluated elements.

After attaining the required 80% agreement threshold, the researchers proceeded with individual observations and evaluations. They employed a non-intrusive approach to observe the pedagogical practices of the teachers, ensuring there was no interference with regular teaching routines. For each classroom, the researchers dedicated 4–5 h to observation and an additional hour for interviewing teachers. This rigorous methodology aimed to produce a thorough and unbiased evaluation of classroom quality.

4.4 Data analysis

In order to initiate an exploratory analysis of the caliber of teachers' pedagogical practice and quality, the IBM SPSS 23.0 software was employed for descriptive statistical analyses and the Shapiro-Wilk test for testing the normality of the data. The audio-recorded interviews were transcribed verbatim and imported into EXCEL. The subsequent analysis involved open coding, axial coding, and selective coding [23], utilised to dissect the transcriptions and discern emergent themes. The analysis procedure was bifurcated into two steps: the initial stage involved scrutinising the transcripts and pinpointing crucial data, while the latter stage entailed structuring the vital data into consistent themes and categories. To ensure the trustworthiness of our qualitative data analysis, peer debriefing was employed [24]. Peer debriefing involved engaging a colleague, who held the position of Professor in ECEC, to verify the accuracy of the identified themes in capturing patterned responses and the meaningful interpretation of the interview data.

5. Results

5.1 Instruction and interaction quality of teachers' practice

As shown in **Table 2**, the total average ECERS-E score was $M = 2.93$ ($SD = 0.48$), which illustrated the inadequate level of instruction quality on the 7-point scale. Regarding the subscales, classrooms received slightly higher scores in literacy M = 3.63 (SD = 0.57) and the lowest score in diversity M = 1.74 (SD = 0.41). The scores in mathematics (M = 3.24, SD = 0.87) and science (M = 3.11, SD = 1.07) also indicated the minimal quality of instruction. Results suggest that teachers showed minimal quality of instruction regarding literacy, mathematics, and science, and they displayed inadequate quality of diversity.

Table 3 demonstrates the interaction quality measured by SSTEW. Classrooms received a minimal quality of interaction (M = 3.92, SD = 0.60). Regarding the

	Literacy M (SD)	Math M (SD)	Science M (SD)	Diversity M (SD)	ECERS-E M (SD)
Total average	3.63 (0.57)	3.24 (0.87)	3.11 (1.07)	1.74 (0.41)	2.93 (0.48)
School type					
Private	3.63 (0.62)	3.25 (0.90)	2.87 (0.89)	1.76 (0.39)	2.88 (0.45)
Public	3.63 (0.52)	3.23 (0.85)	3.31 (1.16)	1.71 (0.43)	2.97 (0.50)
School classification					
District	3.46 (0.50)	2.96 (0.82)	2.78 (1.08)	1.67 (0.50)	2.72 (0.45)
City	3.71 (0.64)	3.42 (0.87)	2.97 (0.94)	1.67 (0.37)	2.94 (0.46)
Province	3.69 (0.54)	3.30 (0.86)	3.51 (1.06)	1.85 (0.35)	3.09 (0.46)
School location					
Suburban	3.56 (0.54)	3.10 (0.81)	3.12 (0.94)	1.70 (0.42)	2.87 (0.42)
Urban	3.70 (0.60)	3.39 (0.91)	3.10 (1.19)	1.78 (0.40)	2.99 (0.53)

Table 2.
Instruction quality measured by Early childhood environment rating scale-extension (ECERS-E).

	Build TCI & SE Well-bg M (SD)	Lang-Comm M (SD)	Learn-Crit M (SD)	Assessing M (SD)	SSTEW M (SD)
Total average	4.44 (0.81)	4.68 (0.89)	3.86 (0.71)	2.19 (0.86)	3.92 (0.60)
School type					
Private	4.29 (0.88)	4.51 (1.02)	3.74 (0.70)	2.00 (0.71)	3.77 (0.69)
Public	4.57 (0.71)	4.84 (0.72)	3.99 (0.70)	2.38 (0.96)	4.07 (0.46)
School classification					
District	4.36 (0.74)	4.55 (0.69)	4.64 (0.69)	2.13 (0.88)	3.97 (0.66)
City	4.27 (1.01)	4.38 (1.11)	3.79 (0.72)	1.85 (0.71)	3.71 (0.76)
Province	4.63 (0.81)	5.03 (0.71)	4.10 (0.88)	2.53 (0.87)	4.18 (0.46)
School location					
Suburban	4.25 (0.81)	4.62 (1.00)	3.74 (0.66)	2.19 (0.92)	3.81 (0.61)
Urban	4.61 (0.77)	4.73 (0.79)	3.99 (0.74)	2.19 (0.81)	4.03 (0.58)

Table 3.
Interaction quality measured by sustained shared thinking and emotional well-being scale (SSTEW).

subscales, classrooms received the highest scores in extending children's language and communications (M = 4.68, SD = 0.89), and the lowest scores in assessing children's learning (M = 2.19, SD = 0.86). In terms of other subscales, classrooms received minimal quality in building trust and confidence and supporting social-emotional well-being (M = 4.44, SD = 0.81), and supporting learning and critical thinking (M = 3.68, SD = 0.71).

In summary, results indicated that teachers generally showed minimal quality of instruction and interaction in Chinese kindergartens. In addition, the quality of providing instruction according to children's diversity and assessing children's learning during instruction was inadequate.

5.2 Teachers' perceived difficulties in instruction and interaction

According to the interview, teachers identified difficulties in their instruction and interaction practice, involving science activities, child-centred approach, scaffolding, and child assessment.

When considering instruction practices, seven teachers reported challenges associated with the development and execution of science-based activities. They perceived these challenges to be more intricate than alternative learning activities, including language, mathematics and art. The educators confronted a dilemma in establishing an equilibrium between encouraging children's autonomous exploration and offering structured guidance throughout the scientific experimental process. These teachers held the conviction that science activities demand a methodical and scientific approach that calls for gradual, systematic guidance from the teacher. However, this level of direction could potentially curtail children's creative ingenuity during their exploratory endeavors.

> *Science activities contain scientific knowledge and are fun at the same time. So the children could not control their behavior and manipulated the materials involuntarily. The teacher does not know how to control it, whether to let the children manipulate more or to guide them step by step. There is such a conflict (Ms. Wu).*

Furthermore, the teachers expressed difficulties in implementing a child-centred approach, namely, maintaining a keen sensitivity to the rapid shifts in children's interests and needs. Even as school principals and governmental guidelines encouraged educators to remain attuned to individual children's interests and to differentiate instruction accordingly, they encountered significant challenges. Integrating children's spontaneous interests into educational activities and devising differentiated lesson plans tailored to address each child's unique needs proved to be a complex task for educators. Such complexities highlight the ongoing tension between pedagogical principles and their real-world implementation within the educational landscape.

> *The teacher may not be able to capture the interest of the children to extend the activity. The teacher may see that the child is interested, but he or she does not take the appropriate action to turn the child's interest into a curriculum. It is difficult for teachers to develop an activity based on children's interests to support their interests (Ms Yang).*

In the realm of teacher-child interaction, the educators involved in this study confronted obstacles in effectively posing questions to and fielding responses from, the children. Specifically, their questioning strategy tended to be circumscribed, primarily prompting children to recollect prior activities or affirm previously learned knowledge, rather than scaffold their cognitive processes or introduce more challenging tasks. In scenarios where children were unable to address the teachers' questions, the educators often stepped in to provide the answers. On the other hand, the teachers encountered difficulties when tasked with responding to children's questions that surpassed their anticipated range. Consequently, they found it challenging to decipher the children's cognitive processes and furnish suitable scaffolding or present appropriate challenges.

> *I think it's still quite difficult to communicate with children because children will have all kinds of different answers. For example, last week I did an activity on the*

> *reflection of light, and when I asked the children questions, I found that they gave you different answers, even if they did not have much to do with the activity. It's hard to imagine what questions the children will ask, what they will observe, and how we should respond (Ms Duo).*

The interviewed teachers universally identified child assessment as a significant challenge in their teaching practice. They experienced a dearth of systematic observation tools or guiding frameworks to enable purposeful observation, resulting in uncertainty about what aspects to observe and how to execute such observations. A notable knowledge gap regarding child development impeded their ability to accurately document children's developmental trajectories. Moreover, deriving actionable insights from their observations, such as determining the appropriate support to provide, and identifying effective methods of delivering it, was a source of considerable confusion. This emphasises the necessity for more comprehensive training and support mechanisms in the domain of child assessment.

> *We cannot always invite children who are active speakers to participate in activities, but if you do not invite them, it will affect their motivation. But if you do not pay extra attention to the group of children with low ability, you cannot give them the opportunity to improve, so they cannot improve. Because there will always be a group of children who love to speak and children who do not speak, I do not know how I can take care of them at the same time, so I can better promote them (Ms. Li).*

5.3 The provision of professional development in preschools

According to the interview, four primary types of PDs that preschool teachers typically engage in were identified:

1. apprenticeship or coaching, which aims to provide teachers with little to no teaching experience with real teaching experience by working alongside or assisting senior teachers in the same classroom;

2. workshops, where principals invite professionals or experienced teachers to share their educational experience related to a specific topic (e.g., how to use the project approach);

3. problem-based discussions, where principals or year-group leaders prompt kindergarten teachers to discuss their teaching problems and devise solutions;

4. school visits, where teachers visit high-quality kindergartens to learn about environmental decorations and teaching strategies.

Problem-based discussions were found to be the most common PD approach experienced by the teachers, with all of them reporting engaging in at least one such discussion each week. Teachers pinpointed three domains—pedagogical content knowledge, learning environment settings, and parent-teacher communication—as areas where they lacked confidence and sought additional PD training.

> *Last semester, the director organized more training, and they would share some examples and previous experiences with us, and then we would talk about the*

> *problems we encountered and discuss them with each other. If there was something we did not understand, we could bring it up and we would work it out together (Ms Li).*

Despite receiving some level of PD training within their kindergarten settings, they critiqued these opportunities as being disjointed and deficient in post-training guidance, which is essential for the effective translation of learnt concepts into practice. This highlights a disparity between current PD offerings and the teachers' perceived needs, indicating a demand for a more integrated and practice-oriented approach to professional development. Consequently, they stressed the importance of coherent PD content that is relevant to their daily routine and that involves follow-up classroom visits to ensure the effective implementation of new strategies.

> *I do not think these trainings are effective. I do not think these trainings are appropriate for everyone. When we particularly need the training content, we may absorb more of it. But I do not think that over the past 2 years, no matter what kind of training it was, it did not feel very useful or solid at the time (Ms Yao).*

In terms of the perceived efficacy of PD, teachers underscored the value of participatory training over passive listening formats. They emphasised the importance of observing practical applications of novel strategies, as such exposure was crucial to their understanding and subsequent implementation. On the contrary, PD endeavors that relied solely on the lecture-based instruction or bore little relevance to their daily teaching practices were deemed to hold minimal value. This feedback points to the necessity of experiential and contextually relevant professional development in effectively enhancing teaching capacities.

> *I do not like the purely theoretical ones. Because in purely theoretical training, you just sit there and listen to the lecture, and you cannot watch him in action. So when I listen to those theoretical lectures, I really get sleepy. I prefer to see the practical operation, and in the process of practical operation, he shares his experience, and his teaching method, I think this is more practical (Ms. Cai).*

6. Discussion

6.1 The characteristics of process quality

The results of the observations with the ECERS-E showed that teachers displayed minimal instruction quality in literacy, numeracy and science and inadequate quality in diversity. The minimal quality of literacy, numeracy and science instructions is similar to the existing research in Australia [2], the UK [8], and Germany [25], as well as a meta-analysis [26] which indicated the average domain-specific quality between 1.13 and 3.9. The result is also in line with previous research in China that identified the minimal quality of teaching and interaction scores measured by the Chinese Early Childhood Environment Rating Scale (CECERS) [27], an adapted quality tool based on ECERS-R. A similar overall pattern appears in Chinese preschools. Teachers were observed to conduct literacy, numeracy and science instructions in their classrooms, however, they did not explicitly highlight the learning content, such as rhyme, shapes and speculations. Their instructions were unable to scaffold children's understanding of the key concepts or encourage children to generalise what they have learned across a

variety of contexts [8]. Despite the similarity, the domain-specific quality in diversity is relatively weak in Chinese kindergartens than in other contexts, which was also been revealed by previous research. This might be related to the Chinese culture which features collectivism and the importance of celebrating diversity is rarely recognised in the curriculum guideline. On the contrary, the ECERS-E Diversity subscale encourages teachers to draw children's attention to ethnic minority people in non-stereotypical roles and challenge gender and race stereotypes. Celebrating diversity in ethnicity, culture, gender, and ability could be further promoted in Chinese preschools.

In terms of the interaction quality measured by the SSTEW scale, teachers generally demonstrated a minimal quality of interaction. Furthermore, a similar pattern of the subscales was also observed regarding the subscales, that is, the interaction quality in Chinese preschools was minimal to good regarding building trust and confidence, supporting social-emotional well-being, extending children's language and communications, but lower regarding supporting learning and critical thinking and learning assessment, which is consistent with findings in other countries [2]. The results indicate that teachers provide a respectful and positive environment to encourage children's autonomy, feeling expressions, play, and communication, while they may miss opportunities to extend children's thinking and provide support for learning [12]. Meanwhile, it is worth noting that the quality of assessing language and learning in Chinese preschools is relatively weaker. Teachers showed inadequate quality in learning assessment which requires teachers not only to understand the curriculum contents and student performance but also to tailor their teaching methods to children's specific needs. This might be related to the official curriculum guidelines. Specifically, the official Kindergarten Education Guideline (trial) [28] in China focused more on summative assessment to certify children's development. These stands of works may contribute to teachers' different teaching practices. The results suggest that teachers need to improve their skills of formative assessment to adapt their instruction and respond to children's thinking appropriately.

From the analysis of the mean scores of instruction and interaction quality, this study revealed that the overall interaction quality was relatively higher than instruction quality. It aligns with existing research which indicated that Chinese teachers provided high-quality classroom interactions rather than implementing learning activities [29]. These preliminary findings suggest the independencies between interaction and domain-specific instruction quality, as teachers may show moderate quality in providing positive and sensitive interactions, however, this does not mean they can translate content knowledge into quality instruction [30]. Therefore, either focusing on instruction or on instruction quality might risk over- or underestimating process quality. Further research with a larger number of classrooms from a range of different cultures and contexts could be conducted to explore their difference and interrelatedness before generalising the finding reported here.

6.2 Teachers' perceived teaching difficulties and PD needs

Consistent with the results of quality measurement, teachers also reported the challenges of instruction practice in science activities, scaffolding children's learning and child assessment. Specifically, they were struggling with initiating activities based on children's spontaneous interests, balancing teachers' directions and children's explorations during the science activities and providing high-quality questions and responses. These dilemmas might be related to the educational reforms in China which aim to replace traditional teacher-led approaches with child-centred pedagogy.

For one thing, there is a lack of guidance on how to conduct a child-centred approach that makes it difficult for preschool teachers to encourage children's explorations, construct knowledge and scaffold children's learning. For the other thing, existing research revealed that implementing a child-centred approach can be challenging and problematic in China due to its relatively larger class size, exam-oriented education systems and parents' expectations of children's academic achievements [20]. Therefore, a balance between a teacher-centred approach and a child-centred approach has been advocated by recent research [31, 32]. This dual approach to teaching requires teachers to comprehend the viewpoints of children, provide opportunities for them to develop their own strategies and concepts and ensure that they assume complete responsibility for organizing the trajectory of their learning [33].

Teachers' previous PD experiences revealed various forms of PD, such as workshops, lectures, problem-based discussions, coaching and school visits. While their primary goal was to enhance their pedagogical content knowledge, classroom management skills and communication with parents, they found that lectures had limited effectiveness in influencing their actual teaching practices. Instead, they found PD programmes that integrated interactive activities, real teaching examples and opportunities for teacher engagement in discussions to be more impactful. This aligns with previous research that the theory-oriented content presented in lectures is challenging to apply in practice [34]. And the significance of modeling teaching techniques and receiving follow-up support was emphasised as crucial aspects of effective PD. Additionally, teachers expressed a strong desire to engage in PD programmes that specifically address authentic teaching problems, utilise interactive activities and modeling instruction, and offer constructive feedback for further improvement. Thus, it is essential to incorporate these elements into future PD programmes.

Teachers also reported difficulties in implementing newly acquired strategies from PD due to their busy schedules and uncertainty about their appropriateness in their own classrooms. To overcome these challenges, teachers may benefit from external support and perspectives to apply these strategies effectively. Follow-up school visits can serve as a helpful approach to assess progress and provide guidance. Research indicates that mentorship for teachers enhances their ability to reflect on and adapt their pedagogical practices, leading to advancements [35]. Critical dialogs with external experts, such as mentors, can aid in identifying and analysing teaching practice issues. Therefore, integrating mentorship programmes and opportunities for critical reflection can be an effective means to help teachers overcome obstacles in professional development and improve their instructional practices.

7. Conclusions

This study utilised the ECERS-E to assess the instructional aspects of process quality and identified that teachers showed minimal instruction quality in literacy, mathematics, science, and inadequate quality in diversity. The findings underscore the need to improve teachers' understanding of race and gender equality and their ability to cater to individual needs. Additionally, the results from the SSTEW scale revealed minimal quality in supporting learning, critical thinking and social and emotional well-being, as well as inadequate quality in assessing children's learning. Accordingly, the PD programme should target these areas of inadequacy in teacher-child interaction. For instance, training should focus on fostering children's higher-order thinking skills and promoting their social-emotional development. Moreover, encouraging

sustained shared thinking through activities like storytelling, book sharing, singing, and rhymes is crucial. Teachers should also receive training in appropriate assessment practices, including reading with children, to effectively gauge their learning and development.

Based on the interview findings, teachers expressed encountering two significant challenges during their participation in the PD programmes. First, they perceived the theory-oriented and fragmented nature of the training as irrelevant to their actual practice. Second, the passive learning experience, where trainers delivered content without facilitating discussion or hands-on practice, hindered their professional growth. Consequently, the effectiveness of these PD programmes was limited. To address this issue, it is recommended that PD programmes adopt a more practice-oriented approach by providing teachers with relevant examples and ample opportunities to practice newly acquired skills. Encouraging active participation and incorporating hands-on activities during PD sessions would foster more effective professional growth among teachers.

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Edited by Hülya Şenol

The preschool period is a period in which children investigate and try to get to know their environment, are willing to communicate with their environment and begin to acquire the value judgments of the society they live in and the behaviors and habits appropriate to the cultural structure of that society. In this period when the foundations of personality are laid, the child needs conscious guidance in home, school, and social life. By providing appropriate educational opportunities in the early years, the development of children's self-care, mind, language, social, emotional, and motor skills can be supported. In a preschool education institution that is well prepared in terms of physical conditions and educational programs, the children learn to establish friendships, cooperate, and develop their skills. Developing human potential to its highest limits is only possible with the opportunities provided in the early years. This book provides a comprehensive overview of preschool education. Chapters address such topics as the importance of literacy, pedagogical leadership, high-quality preschool education, and preschool improvement practices. They also discuss the role of theater in childhood education and community approaches to funding and support. Furthermore, the book examines childhood obesity; connecting home, school, and communities; childcare social enterprises; teacher quality and professional development; motor, cognitive, nutritional, metabolic, and epigenetic influences on early childhood; and instructional and interactional aspects of childhood education.

Katherine K.M. Stavropoulos,
Education and Human Development Series Editor

ISSN 2755-9513
ISBN 978-1-83769-248-4
9 781837 692484

Published in London, UK

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